

Chollas Heights Naval Radio Transmitting Facility
(Chollas Heights Navy Radio Station)
6410 Zero Road
San Diego
San Diego County
California

HAER
CAL
37-SANDI,
31-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
CHOLLAS HEIGHTS NAVAL RADIO TRANSMITTING FACILITY
HAER No. CA-154

HAER
CAL
37-SANDI
31-

Location: 6410 Zero Road
West of College Avenue
North of State Highway 94 (SR 94)
City of San Diego
San Diego County
California

USGS National City and California Quadrangles,
7.5 Minute
Universal Transverse Mercator Coordinates:
1: 493940 E/362250N
2: 493970 E/3622460N
3: 494420 E/3622490N
4: 494270 E/3622120N

Date of Construction: 1915-1916 Original structures
1918-1957 for remaining structures
Alterations continued throughout period of use

Engineer/Architect/Builder: United States Navy/Bureau of Yards and Docks

Present Owner: United States Navy, Department of Defense

Present Occupant: United States Navy

Present Use: Operational

Significance: The Chollas Heights Naval Radio Transmitting Facility was a key component of the United States Navy's development of long-range world wide radio communication systems prior to World War I and continuing up through the Cold War period. The facility is important to the San Diego region for its relation to events in local economic, military and radio science development. The facility was determined eligible for nomination to the National Register of Historic Places in 1993.

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NARRATIVE TEXT

HISTORIC BACKGROUND OF CHOLLAS HEIGHTS NAVAL RADIO TRANSMITTING FACILITY

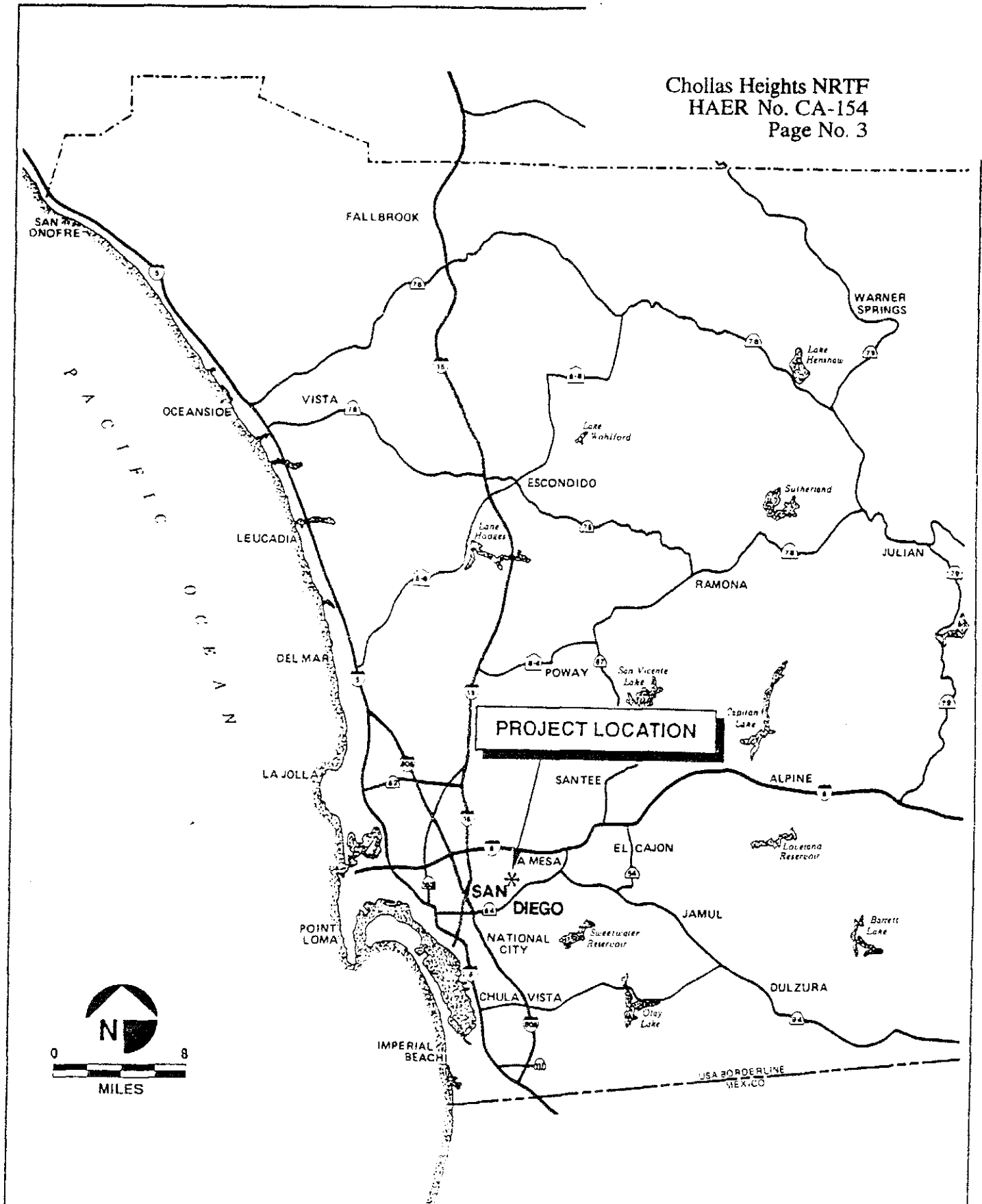
Introduction

The location of Chollas Heights Naval Radio Transmitting Facility is approximately 10 miles east of downtown San Diego at 6410 Zero Road. The facility is located on the National City quadrangles of the USGS 7.5 minute series topographic maps, Township 16 South, Range 2 West in an unsectioned portion of Mission San Diego lands. The site is in the city of San Diego, north of State Route 94 (SR 94) and west of College Avenue (Figures 1 and 2).

The Chollas Heights Naval Radio Transmitting Facility meets Criterion A of the National Register of Historic Places because the installation was part of the world's first network of long-range radio stations, a key development in the progress of radio communication systems. The national significance of the district arises from the pioneering role played by the Facility in the development of U.S. Navy communication systems of unprecedented power and range during the first two decades of the 20th century. The Chollas Heights facility was the largest and most powerful radio transmitter in North America in 1917 and provided the first reliable radio link between the Navy's communications center in Arlington, Virginia; Pearl Harbor, Hawaii and Cavite, Philippine Islands during World War I (Manley and Wade 1991:1) (Figure 3).

Locally the site is significant as the first architecturally unified complex built by the Navy in the San Diego area as they embarked on an expansion program to meet the emerging needs dictated by World War I. In 1915, when construction of the Facility began, other Navy buildings were designed using East Coast architectural styles, reflecting a colonial heritage that was not appropriate to the San Diego region. The Facility was designed in the Mission Revival architectural style as a complete complex of technical buildings and support facilities. The placement of the buildings in a cohesive and integrated siting was complemented by landscaping designed to enhance the structures and provide a comfortable and attractive work and residential setting (Manley and Wade 1992:1).

The Facility at Chollas Heights was the first example by the U.S. Navy of this usage of local regional themes and materials to create a functional and pleasing facility. As the development of facilities on the West Coast took increased importance due to national activities in the Pacific regions, a distinct regional style developed which would be improved and expanded with the creation of Naval Air Station, North Island, constructed shortly after the facility at Chollas Heights. Bertram Goodhue, an important architect who used the same style to great advantage on Coronado, continued this same concept of a totally integrated design begun so effectively at Naval Radio Transmitting Station, Chollas Heights (Naval Air Station, San Diego Historic District Nomination 1990).



Regional Location of Project Site

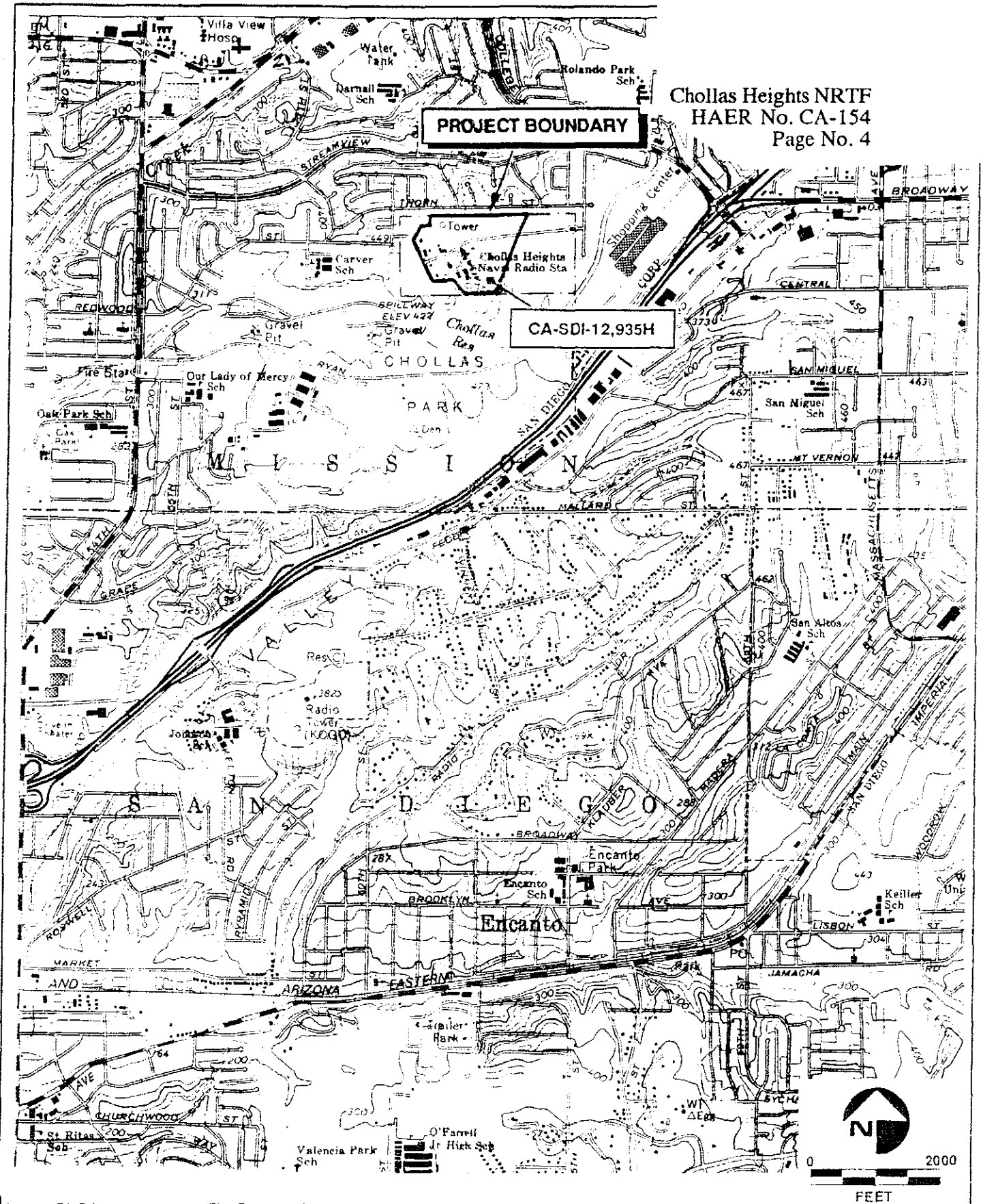
FIGURE

1

Chollas Heights NRTF
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PROJECT BOUNDARY

CA-SOI-12,935H



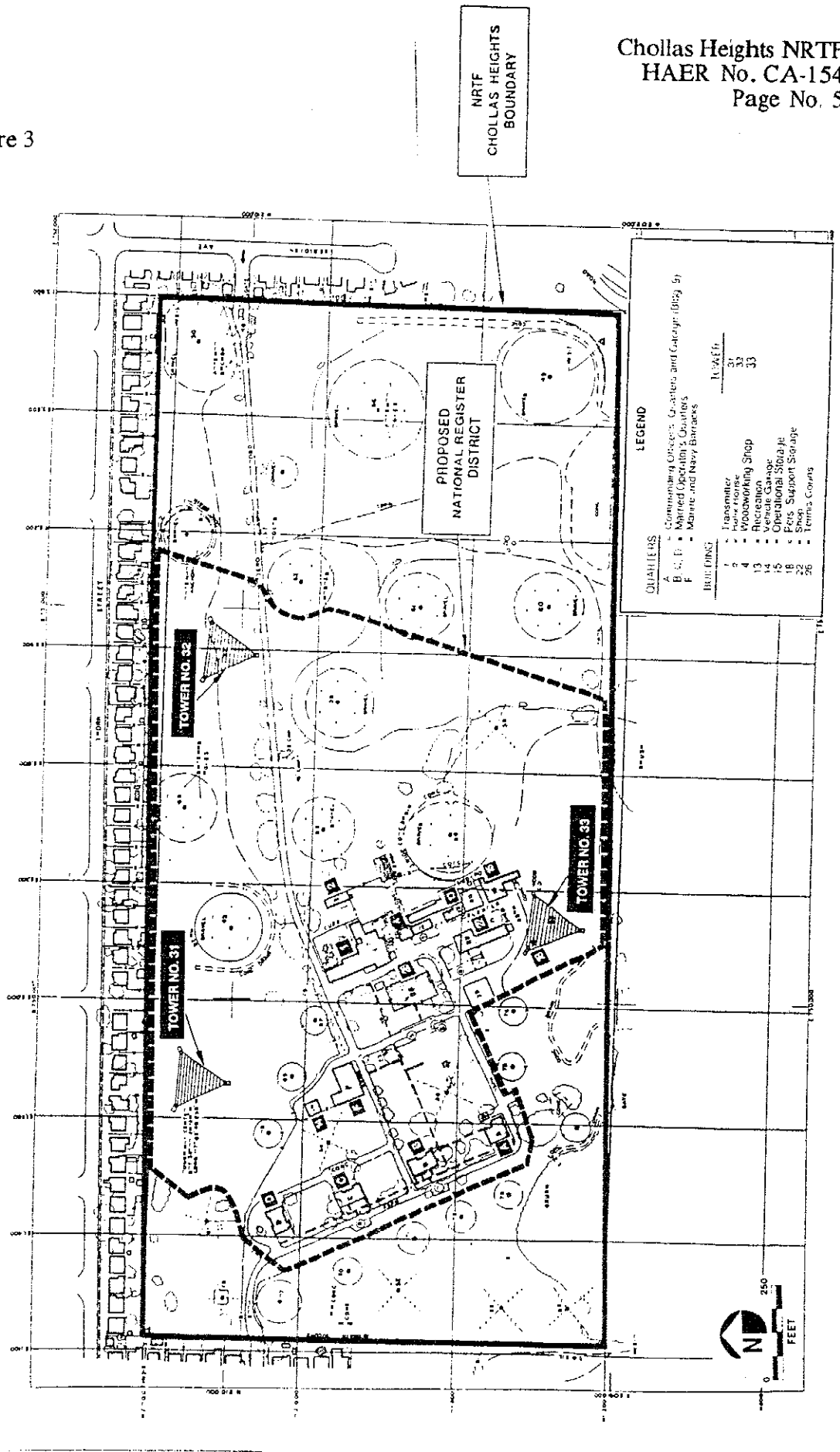
MAP SOURCE: 7.5' National City Quadrangle

FIGURE

2

Project Location Chollas Heights NRTF

Figure 3



History of Radio Development

The foundation of radio science lies in the discoveries of Ampere, Oersted, Faraday, and Henry who developed the principles of electric induction and the electric and magnetic fields surrounding currents carrying current. The synthesis of this knowledge into a single unified theory can be credited to the Scottish physicist, James Clerk Maxwell in 1867 and 1873. In 1887, Heinrich Hertz, while testing the hypothesis of Maxwell, discovered radio waves and demonstrated that they exhibit the properties of light waves (Mayes, 1989:139-140; Howeth 1963:15-20).

The efforts to communicate without wires, "wireless telegraphy", led many scientists to explore the whole field of electromagnetic energy and related topics, including radio, infrared, visible light, ultraviolet and gamma rays. The long range impacts, commercial and military, could only be guessed at by adventurous dreamers of the late 19th century. The commercialization of radio waves was undertaken by Guglielmo Marconi in 1896 when he approached various groups with a proposal to use Herzian waves for commercial communications. He created the Wireless Telegraph and Signal Company in 1897 and within one year, it became possible to send messages for a distance of 18 miles. Over the next two years, radio tuning transmitters and receivers were developed in the same wave length in order to avoid interference between stations and conserve the power of the radiated waves (Howeth 1963:15-20; Mayes, 1989:139-140).

The disaster of the sinking of the Titanic in 1912 led to significant changes in the development of radio science and new applications of the technology. A wireless set on the ship had alerted rescuers and 705 lives had been saved, but the closest ship which could have saved all the persons aboard only had one radio operator and he was off duty at the time of the distress call. Suddenly the significance of radio communication loomed large and quickly the Radio Law of 1912 was put into effect. The law required that ships carrying 50 or more passengers be equipped with radio equipment and have 24-hour operation of the equipment (Mayes 1989:21).

Over the next sixteen years, the science of radio transmission occupied the attention of many inventors and scientists and great strides were made in the advancement of radio technology. The creation of the three-electrode tube, or audion, which amplified and detected radio waves became the cornerstone of modern radio and subsequent electronic devices. The development of the Poulsen arc in 1903 by Danish electrical engineer, Valdemar Poulsen, was one of the first successful uses of "continuous wave" technology and outperformed other types of arc transmitters. The Federal Telegraph Company had exclusive American rights to distribute the Poulsen arc and by 1912, the U.S. Navy was testing the arc for its communication system. Long-distance radiotelephony from Arlington, Virginia to Hawaii was accomplished by the American Telephone and Telegraph Company in 1915. During this same time frame, the regenerative circuit and the superheterodyne circuit were developed and very quickly the possibilities of commercial uses attracted a wide range of entrepreneurs. The United States Department of Defense, faced with the prospect of entering World War I at some time in the probable near future, realized the enormous importance of the emerging technology (Howeth 1963:15-20; Mayes, 1989:139-140; Government Printing Office 1921:365-379).

U.S. Navy Communications Development

During the 1890s, the United States acquired a number of new territories in the Pacific area, including the Hawaiian Islands and Samoa, both with excellent harbor potential capable of berthing sizable ships. In 1898, the United States entered into the Spanish American War and as a result of the war, the U.S. acquired territory in the Philippine Islands. Communications during the war had been awkward at best and included the use of transoceanic cables which were severed, flag and light signals and even carrier pigeons. In 1901, Theodore Roosevelt became president upon the assassination of William McKinley and launched the nation on a new course of "Big Stick" diplomacy. The phrase "Big Stick" came from an African proverb that stated "walk softly and carry a big stick," a philosophy embraced by Roosevelt (Bailey 1979:421-444).

With Roosevelt's presidency and the acquisition of new territories, particularly in the Pacific Ocean as a result of the extension of our Manifest Destiny views to foreign regions, the United States became a participant on the international scene in wholly new ways. Under Roosevelt's command, as a former Under Secretary of the Navy, the United States Navy underwent extensive changes and development. In 1908, the U.S. Navy's "Great White Fleet" sailed around the world on a combination goodwill tour and show of naval strength. America was now positioned to play a leading role in world affairs throughout the 20th century (Bailey 1979:451-462; Mayes 1989:149; Howeth 1963:143).

Major changes were taking place during the years 1890-1910 as the United States began to establish naval facilities in the Pacific area. As the development of the modern naval fleet commenced, it was clear that modern shops, larger drydock and berthing facilities, and the accompanying shore support facilities would have to be constructed to meet the needs of the 20th century Navy. All the various branches of the military underwent a similar expansion and modernization program as the U.S. extended their operations in the Panama area during the construction of the Panama Canal; in Central America, Haiti, the Dominican Republic, Hawaii, Samoa and the Philippines between 1890-1915. The United States was actively involved with the construction of the Canal and subsequently the activities in both the Caribbean Sea and the Atlantic and Pacific Oceans. In order to successfully enhance the American presence in these regions, an expanded U.S. Navy was essential. During these years, Congress passed various pieces of legislation expanding the branches of the military in a number of key ways (Government Printing Office 1921:367-369).

One piece of legislation that directly affected the creation of new naval facilities was the Naval Appropriation Act of April 4, 1911 which charged the "Bureau of Yards and Docks with the design and construction of the public works and public utilities of the U.S. Navy, wherever located, and irrespective of the bureau or office of the Navy Department which may use or operate them and the appropriation or fund from which their cost may be defrayed". With the advent of World War I in 1914, the defense picture of the United States changed in many significant ways. At the start of the war, an extensive survey of the military resources of the nation was undertaken, and it was clear that should the United States enter the war, it would be necessary to expand the fleet, naval shore facilities, enlistment and the merchant marine. A three year expansion program was drawn up and implementation began in 1916. One of the key results of the war was the realization that the country would be required to support a two ocean fleet in both the Atlantic and the Pacific Oceans. This necessitated the establishment of additional shore facilities on the

west coast to provide service, repairs and supplies for the Navy (Government Printing Office 1921: 17).

Prior to the entrance of the United States into the war in 1917, the Bureau of Yards and Docks constructed public works within the continental United States and its possessions but it became necessary to construct public works projects in a variety of nations around the world as the United States expanded its war effort. One of the most important concerns of the Navy was its communication system in the years before the war and the focus became the new radio technology that was emerging and rapidly becoming viable for a variety of uses. The Navy had attempted to purchase equipment from Marconi in 1899 but the price was too steep and so the Navy turned to its own resources. Serious testing and development programs were begun to explore the possibilities of this new science and its applicability to naval activities (Government Printing Office 1921: 17; Manley and Wade 1992:11).

Tests on the Poulsen arc convinced the U.S. Navy of its superiority over other types of equipment and changed their plans accordingly. The Navy wanted radio equipment powerful enough to reach Guam and the Philippines, and after the Federal Telegraph tests on the Poulsen arc, the firm was asked to design a 100 kw transmitter for a station planned for Darien, Canal Zone, in anticipation of the opening of the Panama Canal. The challenge to produce a transmitter in this size and power capacity was successfully met and it quickly became clear that the new technology could provide a critical link among the naval facilities around the world.

In August 1912, Congress appropriated \$1.5 million for the construction of the world's first high-power chain of radio stations and the contract was given to Federal Telegraph because of their success in the Canal Zone. By 1913 approximately 30 radio stations had been constructed and were in active use. Plans for the radio communications system expanded rapidly after the successful installation of the Poulsen arc at Darien on July 1, 1915 and developments proceeded rapidly at San Diego, Hawaii and the Philippine Islands for the new system. San Diego was commissioned in January 1917 with a 200 kw transmitter. Pearl Harbor and Cavite were operational late in 1917 and contained 350 kw transmitters. The creation of this system dramatically improved naval communications and was the most powerful radio network at the time of its development and proved to be a giant step forward in telecommunications. For a period of time, the arc transmitter at Chollas Heights was the most powerful transmitter in North America until it was superseded by other links in the chain of stations (Manley and Wade 1992:10-11; Government Printing Office 1921:367-369).

The start of World War I gave added impetus to the development of new naval facilities, particularly radio stations. Initially, the naval radio stations were operated by the Bureau of Engineering and all development of new radio projects rested with that particular bureau. The actual design and construction of all public works relating to radio stations was under the Bureau of Yards and Docks. The Bureau of Yards and Docks was responsible for not only new construction but additions to existing facilities which could include the construction of self-supporting towers which varied in height from 150-820 feet, guyed masts, operating buildings, power houses, quarters, barracks, water and sewage systems, fences and flood lighting (Government Printing Office 1921:367-369).

The stations at Chollas Heights, Pearl Harbor and Cavite were constructed under the Bureau of Yards and Docks programs. At each station, the installation consisted of three 600 foot triangular self-supporting steel towers with the necessary buildings to support the operations of long distance radio communications. The towers were constructed according to the standard design created by the Bureau of Yards and Docks for this specific purpose. Due to the exigencies of war, the need for uninterrupted communication was critical and the stations were constructed with considerable speed (Government Printing Office 1921:367-369).

A similar style high power station was constructed at Cayey, Puerto Rico in October, 1917 and in November 1917, a contract was undertaken for the construction of four 600-foot towers on Greenbury Point, across the Severn River from the Naval Academy at Annapolis. In addition, all the standard operating facilities - wharves, water-supply systems, quarters, barracks and transmission buildings - were quickly constructed as the U.S. Navy expanded its radio communications network. The Annapolis facility, along with a similar station at New Brunswick, New Jersey, were considered to be the most powerful radio transmission stations in the world. While the construction of the stations was underway, plans were completed and contracts let for the construction of a mammoth transatlantic station, the Lafayette Radio Station, at Croix d'Hins, Gironde, France. The eight towers at Lafayette were 820 feet high, 220 feet higher than any existing in the United States (Government Printing Office 1921:367-369).

In addition to the high power radio stations, a number of installations with more moderate power were also constructed during the years of World War I. Facilities were constructed at the navy yards at Philadelphia, Charleston, Bar Harbor and the islands of St. Thomas, Virgin Islands; and Port au Prince, Haiti. The facility at Bar Harbor, Maine eventually played a key role in the system as all overseas messages came through this facility. Additional small scale facilities and minor projects were carried out in New Orleans, Louisiana; Keyport, Washington; Seward, Alaska; Key West, Florida; Portland, Maine; Portsmouth, New Hampshire; North Truro, Massachusetts, St. Augustine, Florida; and Cuba (Government Printing Office 1921:367-369).

Chollas Heights Naval Radio Transmitting Facility Development

Introduction

In 1914, the Department of the Navy purchased a 73.65 acre parcel for the construction of Naval Radio Transmitting Station, Chollas Heights. The facility was commissioned in 1917 as part of a system that began in Arlington, Virginia, extended to the San Diego facility, continued on to Pearl Harbor, Hawaii and terminated in Cavite, Philippine Islands. The system became a major component of the worldwide U.S. Navy radio communications system and was considered to be a technological high point. The field of radio technology was accelerating rapidly, as was the role of the United States in world affairs, and the new systems were expected to help establish United States military superiority during the years of World War I (Manley and Wade 1992:1).

San Diego Regional History

A review of cultural activities that have taken place within San Diego County provides a record of Spanish, Mexican and American rule, occupation and land use since the late

1700s. An abbreviated history of San Diego County is presented for the purpose of providing a background on the presence, chronological significance and historical relationships of resources within the study area.

The Spanish Period (1769-1821) represents exploration; establishment of the San Diego Presidio, and the San Diego and San Luis Rey missions; the introduction of horses, cattle, and agricultural goods; and a new method of building construction and architectural style. Spanish influence extended beyond the year 1821, when California became a part of Mexico, for the missions continued to operate as in the past, and laws governing the distribution of land were also retained for a period of time.

The Mexican Period (1821-1848) began when Mexico declared its independence from Spain and ended as a result of the Mexican-American War in 1846-48 when California became part of the United States. Spanish laws and practices were retained until shortly before secularization of the San Diego Mission in 1834, over a decade after the end of Spanish rule. Several grants of land were made prior to 1834, but after secularization, vast tracts of land were dispersed through land grants. Cattle ranching prevailed over the agricultural activities, and the development of the hide and tallow trade increased during the early part of this period. The Pueblo of San Diego was established and transportation routes were expanded.

The American Period (1848-present) began when Mexico ceded California to the United States under the Treaty of Guadalupe Hidalgo. Terms of the Treaty brought about the creation of the Lands Commission, in response to the Act of 1851, which was adopted as a means of validating land ownership throughout the state through settlement of land claims. Few Mexican ranchos remained intact because of legal costs and lack of sufficient evidence to provide title claims. Much of the land that once constituted the rancho holdings became public land, available for settlement by emigrants to California. The influx of people to California and the San Diego region was the result of various factors, including the discovery of gold in the state, conclusion of the Civil War, availability of free land through passage of the Homestead Act, and importance of the country as an agricultural area supported by construction of connection railways. The growth and decline of towns occurred in response to an increased population and the economic "boom and bust" in the late 1800s.

By 1900 national events were affecting the San Diego region. The connection of San Diego to the rest of the nation by train during the 1880s had been one of many factors leading to greater involvement in national trends; West Coast residents with wealth and family in the East continued to monitor major developments. The plans during Roosevelt's administration to build the Panama Canal led to great enthusiasm and interest in San Diego, an area that had the potential to benefit greatly from the creation of the Canal. San Diego's location placed it prominently as the first U.S. port north of the Canal Zone which interested the U.S. Navy and many entrepreneurs. Commercially and militarily, San Diego had much to offer and much to gain from this important national activity. Local leaders made plans to create a large fair to advertise the numerous possibilities offered by the San Diego area. The creation of the Panama-California Exposition in 1915 not only attracted thousands to San Diego's potential but the creation of a Spanish Colonial Revival/Mediterranean architectural style based on the Hispanic heritage of the region influenced building design for decades to come.

Chollas Heights Naval Radio Transmitting Facility History

Chollas Heights Naval Radio Transmitting Facility was a component of the U.S. Naval Communication Station San Diego. Elements of what was the Naval Communication System were first established in the San Diego area in 1906 as part of the Eleventh Naval District. In that year, Marconi successfully applied his new "Wireless Telegraphy" in ship-to-shore communications in an experimental program. As a result of the program, wireless facilities were installed on ships of the fleet. A planned program to establish a chain of Wireless shore stations was initiated. In May 1906, "Navy Radio San Diego" was commissioned. The first facilities were located on Point Loma in one small frame building in which was installed a "Massie" type spark transmitter. With limited equipment and facilities, Radio San Diego handled in excess of 3,000 messages during the first year of operation (U.S. Navy Station History 1906-1958:1-4).

The mission of the U.S. Naval Communication Station San Diego was to provide facilities for fleet support communications including a secondary fleet broadcast (maintenance status), ship-to-shore, relay and point-to-point communications; to provide communication support to the Commander, Southern Sector, Western Sea Frontier, the Commandant Eleventh Naval District; the Commander, Naval Base San Diego and to other activities in the San Diego area; to accomplish special communication functions through the Naval Security Group; and to provide other services as assigned. The mission was originally to support the operating forces and elements of the shore establishment (U.S. Navy Station History 1906-1958:1-4).

In 1908, Radio San Diego participated in a series of tests conducted by Dr. Lee DeForest on board the *USS Connecticut*, a part of the Great White Fleet currently touring the world in a demonstration of U.S. seapower. Radio San Diego engaged in conducting experiments with ship-shore radio telephone communications which contributed to the advancement of radio broadcasting. This type of activity would take place all through the next eight decades as the on-shore facilities participated in a wide range of tests, experiments, and exercises with the ships at sea. Continuous upgrading of equipment and new technology required continual testing as the outer boundaries of the developing radio telecommunications field expanded and new applications were undertaken (U.S. Navy Station History 1906-1958:1-4).

Within the 11th Naval District, there were a variety of facilities including:

- Radio Station, Point Loma, 12.5 acres with twelve buildings
- Radio Station, Inglewood, 7.39 acres with six buildings
- Radio Compass Station, Imperial Beach, 1.9 acres with three buildings
- Radio Compass Station, Point Fermin, 3 acres with 1 building
- Radio Compass Station, Point Hueneme, 68 acres with 4 buildings
- Radio Compass Station, Point Arguello, 1 acre with 8 buildings
- Radio Control Station, Headquarters SD, 3 rooms located in Headquarters Office Bldg.

Technical advancements, Navy Department needs, and Congressional actions, resulted in the development of new stations in the San Diego area to support Radio San Diego. On July 21, 1914, the government purchased 73.6 acres in the Chollas Heights area from

Mr. Harry Flavel Carling for the purpose of establishing a transmitter station to provide a high power transmitter unit capable of handling traffic from Washington to the Pacific area. The development of the station was enthusiastically reported by local newspapers as it was a clear indication that the Navy was establishing a more substantive presence in the region. The Navy was rapidly developing as a major component of the nation's military strength and the creation of West Coast bases promised to bring increased prosperity and activity to the San Diego region. San Diego leaders had begun attempting to interest the Navy in its fine harbor and military potential as early as 1871. As world events escalated and the power structures were altered by such events as World War I and the Russian Revolution, the Navy viewed the San Diego region with great interest (U.S. Navy Station History 1906-58:1-6).

The site chosen by the Navy for the radio transmitting station was located on a small mesa in an area known as East San Diego. A sparsely populated area of small farms, the spot seemed an ideal locale to meet the requirements needed by the station. Adequate security was essential and the space to add new facilities as the technology was sufficient. Water was provided by the 90 million gallon Chollas Reservoir with an embankment style dam. The dam and standby reservoir had been constructed in 1901 and put into active service in 1906 to assure a steady supply of water for the area if something happened to the main supply (San Diego Historical Society, Chollas Heights Vertical Files).

Regular reports in the San Diego *Union* kept readers aware of the events happening on the base. The technology of radio science was of great interest to many people and in 1916, the San Diego *Union* contained the following quote for its readers:

Three fabricated steel towers, will each be 600 feet in height, triangular in section, 150 feet in width at the base and 8 feet at the apex. The towers will be placed 1100 feet apart and will cost \$90,000. The foundations of the towers, made of reinforced concrete, cost \$7125. The phosphor bronze antennae wires, stretching between the tops of the huge masts will weigh more than a ton (1/1/16 7:8).

Construction took place during 1915 and 1916 with Bureau of Yards and Docks plans. The transmitting station at Chollas Heights was commissioned in 1916 and was subsequently identified as the U.S. Naval Radio Station (T). The first transmitter was a giant 200 kilowatt, Poulsen-arc transmitter, capable of being remotely keyed from the Point Loma operating site (U.S. Navy Station History 1906-1958:1-6; Government Printing Office 1921:365-371).

The transmitter was ready for testing by January 1917. The actual testing was a great occasion for local people and Navy officials and was attended by more than 150 people. Local citizens, such as Mayor Edwin Capps, members of the Chamber of Commerce, the Merchant's Association and prominent leaders of the community all attended what they knew was an important development for San Diego. Navy personnel in attendance included Lieutenant Commander Edwin H. Dodd, Superintendent of the Naval Radio Service for the Pacific Coast; Lieutenant Stanford Hooper, aide to the Chief of Naval Radio Service; Lieutenant Commander George C. Sweet, a leader in radio development, Lieutenant Ernest Swanson, Port Commander; Lieutenant John Ashley, Superintendent of the Southern California Naval Radio District; and George Hanscom, Naval Radio Engineer

and supervisor of construction for the Station (San Diego *Union* 1/27/17 1:2; Manley and Wade 1992:15).

The first transmission of the Station's call letters to the station at Arlington, Virginia was made by Lieutenant Hooper. Following his successful transmission, Mayor Capps sent the following message:

In behalf of the citizens of San Diego I have the honor of extending to you the season's greetings and their good wishes and congratulate you upon the completion at San Diego of the world's most powerful radio station. Space has been completely annihilated and the Atlantic and Pacific seaboard are as one (San Diego *Union* 1/27/17 1:2).

Josephus Daniels, Secretary of the Navy, conveyed official Navy congratulations with a brief message:

Your greetings and congratulations much appreciated. The Navy Department rejoices with San Diego that the completion of the new radio station at San Diego places Washington in closer touch with the Pacific coast and particularly with the Navy's larger development at San Diego. It must be gratifying to know that the apparatus is the product of a California company [Federal Telegraph] (San Diego *Union* 1/27/17 1:2).

The complex created at Chollas Heights consisted of a number of components necessary for radio transmission and support services. The principal features of the transmitting facility at Chollas Heights were the three steel self supporting towers, Building 1 for transmitting, a modern antenna and ground system, a powerhouse and quarters for operators, all built in 1916. Over the years additional support buildings were constructed, residence capacity expanded, and recreational facilities, including a pool (the pool was also used to cool the equipment) and tennis courts, were added for the enjoyment of Station personnel and their families (Plan Files, Construction Battalion Center, 1915-1957).

The transmitting site at Chollas Heights became an essential component of Radio San Diego, and developed continuously over the next several decades. As the technology changed, upgrades of equipment were necessary to keep pace with the rapid expansion of the industry. On June 29, 1918 a contract was let to Louis A. Geisler for construction of two double married operator's quarters, Buildings C and D, for \$15,207.00. On August 21, 1918, a Contract No. 3130 was let to Walter Slater for construction of a barracks building to house fifty U.S. Marine Guards on duty at the station. Building F was to be a "wooden structure of first-class material" and cost \$25,537.70 with a completion date of January 1, 1919 (U.S. Navy Station History 1906-1958:1-6; Government Printing Office 1921:365-371; 11th Naval District, Report of Activities 1915-1920).

As the radio technology changed rapidly, during fiscal year 1919-1920 new equipment was added to the system to keep pace with new developments. A 30 kw. primary arc set was installed and a 5 kw. secondary spark set was removed to Point Loma. On December 8, 1919 a contract was let to the Walter Slater Company for \$7,500.00. The contract was to construct a concrete building to adjoin the power house, Building 2, for the housing of the large helix coil being used in connection with the superprimary arc. The old antenna system was altered in design and additions were made to it. A single wave transmitting

system was installed by the Federal Telegraph Company. The only building erected in connection with the installation was a temporary sheet iron shelter to house the condenser plates (11th Naval District, Report of Activities 1920; U.S. Navy Station History 1906-1958:1-6).

Additional developments on the base at this time included construction of a roadway and grading within the Station at a cost of \$2500.00. The roadway was constructed through the East Gate leading to Lemon Grove from the central group of buildings. A large area was surfaced adjacent to the Building 2, Power House, on the south. Maintenance of the towers has always been an ongoing concern and by November 19, 1919, a contract was let to the firm of Kootz and Banks for painting the towers. The total cost was \$8,288 which included two days overtime pay (11th Naval District, Report of Activities 1920; U.S. Navy Station History 1906-1958:1-6).

In 1924, the first electron tube type transmitter used by Radio San Diego was installed at Chollas. By this time the small station at Point Loma had been converted into a radio receiving and monitoring station under the cognizance of the Eleventh Naval District Communication Officer/Radio Material Officer. Concurrent with this, control and operational facilities were established at the District Headquarters in downtown San Diego. Received radio signals at Point Loma were connected by landline directly to operating positions at the District Headquarters, which were also connected by landline to the transmitters at Chollas Heights, thus permitting remote control of both receivers and transmitters from the District Headquarters. Service to the fleet and to shore command was expanded; Radio San Diego was to provide back up support for the primary circuits at Radio San Francisco, Material Officer, Mare Island Shipyard (U.S. Navy Station History 1906-58:1-6).

During the 1920s and early 1930s additional buildings were added to the Station. In 1930 lights were installed on the towers, in 1934 the bridge plates were renewed and in 1936 a portion of the antenna was torn out by a lowflying airplane. By 1937 there were 26 structures on the base which included eleven family quarters, one barracks building with capacity for 20 enlisted men, a power house, office, garage, shop, pump house, water tank and recreational facilities (Manley and Wade 1992:16; U.S. Navy Station History 1906-58:1-6).

Transmitting equipment changes in 1937 included an AC electrical current from San Diego Consolidated Gas & Electric Company; an 11,000 v, 60 cycle, 3 phase transmitter changed on station by the power company to a 2,300-1,100-440-22-110 v; 2,000 kv-a available system. All lines were underground and a 20 kv-a gas engine emergency unit was also installed (Manley and Wade 1992:16; U.S. Navy Station History 1906-58:1-6); 11th Naval District Report of Activities 1937.

On December 7, 1941 the transmitters at Radio Pearl were down for regular maintenance and during this period, Radio San Diego was rebroadcasting the Pearl high frequency signals, using the receivers at Radio San Francisco. The first news of the Japanese attack on the fleet at Pearl Harbor was broadcast by Radio San Diego. During the war years, continued expansion and improvements to the facilities at Radio San Diego were made to support the operating forces and the shore activities in the southern California area. The regional support played a vital role to the Pacific fleet during these war years (Manley and

Wade 1992:16; U.S. Navy Station History 1906-58:1-6); 11th Naval District Report of Activities 1937.

In 1947, to provide more space for the Navy Electronic Laboratory at Point Loma, Radio San Diego (NPL) was relocated to Imperial Beach. At the same time the U.S. Naval Communication Station, Eleventh Naval District Headquarters under a Commanding Officer was established and the facilities of Radio Control and the Communication Centers located in the District Headquarters, Naval Radio Station (T) Chollas Heights and Naval Radio Station (R) Imperial Beach were combined. In 1948 the Radio Station Point Loma was officially disestablished. In 1953, the U.S. Naval Communication Station, Eleventh District was redesignated as the U.S. Naval Communication Station San Diego (U.S. Navy Station History 1906-58:1-6).

During the 1950s and 1960s, the Cold War era, communications continued to be vital and the Station played a key role in many of the telecommunications developments of the time. The U.S. Naval Communication Station San Diego and its various components participated in a wide range of Navy activities, presidential visits, naval exercises and experiments to test the capacity of new systems. Equipment designed to upgrade the power and ability of the stations to increase and enhance communications was continually updated (U.S. Navy Station History 1906-58:1-6).

In 1961 installation of a coaxial-type, RF patchboard at NAVRADSTA (T) Chollas Heights allowed improvement of the antenna flexibility for the medium and low power transmitters. Also included in this installation were six CU-729/U antenna couplers to permit the connection of Vertical Doublet antennas to the coaxial patch board (U.S. Navy Station History 1961:1-4).

In addition to normal projects and maintenance activities, NAVCOMMSTA San Diego participated in a special communication project with the *USS Kitty Hawk* consisting of special ship/shore communication channels to the ship for an anticipated presidential visit. A single sideband model AN/FRT-53 transmitter was temporarily installed and made operational at NRTF, Chollas Heights. The presidential visit was canceled but the *USS Kitty Hawk* held a naval demonstration off the coast for leading civilian and military officials to demonstrate the new technology (U.S. Navy Station History 1961:1-4).

An equipment replacement program in 1962 installed four 10 kw single side band transmitters. A D-C keying line for remote operation of transmitters allocated for the "FRA" broadcast were replaced by an audio channel between NAVCOMMSTA SFRAN (Stockton) and the Chollas Heights transmitter station. This audio channel was multiplexed by Navy carrier telegraph equipment to provide two keying circuits. One of these circuits was allocated to the transmitters for the FRA broadcast and the other circuit to transmitters for the FR broadcast. As the year ended, the Station was providing three transmitters for the FR broadcast and four for the FRA broadcast (U.S. Navy Station History 1962:1-5).

In 1963 programmed equipment replacement resulted in considerable improvement at the transmitter station. Four AN/FRT39, one AN/FRT-40 transmitters were installed. Five 6-28 mc conical monopole antennas were constructed and installed by station forces. The streets and roads were resurfaced, and structural improvements were made to the barracks, galley and mess hall (U.S. Navy Station History 1963:1-3).

In 1964 the 30,000 gallon elevated water tank, constructed in 1915, was removed by a demolition contractor. Continued progress was made in the equipment replacement program as nine new transmitters installed. The new transmitters consisted of one AN/FRT-40, seven A/FRT-39 and one AN/URT-19. As a result of these improvements, extensive site preparation was necessary, including grading, leveling and filling. This activity was accomplished in preparation for installation of new antennas (U.S. Navy Station History 1964:1-6).

In 1965 a new gate house was constructed by PWC SAN DIEGO at the main station entrance. Preliminary planning for a new fleet Radio Transmitting Station to replace NAVRADSTA (T) Chollas Heights was started in the latter part of 1964 and continued into 1965. Initial consideration was given to using 800 acres at MCB Camp Pendleton for this purpose. The Commandant Marine Corps withheld approval for locating a transmitter station at any site within Camp Pendleton and additional surveys were initiated to locate a suitable place (U.S. Navy Station History 1965:1-4).

One of the main functions of the Station was to participate in the various onshore/offshore activities. New equipment was installed by INIMAN SAN DIEGO and/or Station forces during 1965. This new equipment include new transmitters and associated equipment: six AN/FRT-39, two AN/FRT-40, six Conical Monopole antennas, nine monocone antennas, seven RLPA antennas, six 10 Dielectric Patch Panels, and four overhead exhaust fans for the transmitters (U.S. Navy Station History 1965:1-4).

Continuing on into 1966, the station power improvement program resulted in a section of the secondary distribution panel being replaced, including additional new equipment. The list include one AN/FRT-72A, three AN/UGA-4, two KY-43A/URT, seven CU-1599/URT, and seven AS-1974/FRC Conical Monopole Antennas. Staffing problems during this period included a shortage of radiomen to operate the machinery. Also, a lack of electronic technicians was an additional headache for Station commanders. Many times the technology emerged first and then the technical staff had to upgrade their training so some lag time was built into the system (U.S. Navy Station History 1966:1-6).

A new Power Improvement Program for COMMCENTER and Naval Radio Station (T) Chollas Heights in 1967 was planned to double the transformer capacity and additional primary switchgear was added. To assist in the development of the project a 500 kw mobile diesel unit was temporarily installed to replace the 30 year old 170 kw unit. New equipment added at this time included: four TAB-7, three PP-4473/UG, three AN/USM-140C, one AN/USM-105A, one 1025/U, one MX-2995B/USM-117, one TS-2333A/USM, one CAQ1 400H, and one CSI-4514 (U.S. Navy Station History 1967:1-4).

The Power Improvement Program continued into 1968 and provided for an additional 750 LVA transformer and additional switchgear at the Station. Added the Station's equipment was one AN/USM-117B, one SG-582/U, four DA-484/URT, one TV-7D/U, one AN/FCC-69, one TS-2778/USM, one AN/USM-207A and three TD-908/UG (U.S. Navy Station History 1968:1-3).

In 1969 the Station participated in an activity designed to provide communications and cryptologic support for operation BREECHES BUOY (Repatriation of *USS Pueblo* personnel). This was typical of the types of activities carried on at the Station and continued the role played by the Station from its inception. During this same year, the

Public Works Center San Diego began installation of three additional conical monopole antennas. Tests were conducted to improve harbor coverage and coverage to ships at sea beyond thirty miles for UHF RATT circuits and the tests indicated that coverage could be improved by installing UHF radio equipment in Building 1 and by using the old microwave tower at the Station for UHF antennas. The project was completed in 1970 (U.S. Navy Station History 1969:1-7).

In 1970 NAVRADSTA (T) Chollas Heights was disestablished as a separate shore activity by OPNAV NOTICE 5450 on 5 October 1970. The Station retained its departmental status and was then designated as Chollas Heights Naval Radio Transmitting Facility. The program of participating in fleet exercises, special coverages, and COMSEC surveys continued. New equipment continued to be installed to meet the needs of the fleet and included: five AS-390 UHF Antennas, two AN/URC-9 UHF Transmitters, one AN/SRC-20 UHF Transceiver, two AN/URR-35 UHF Receiver, one AN/FCC-69 Telegraph Terminal and one TS-26165/UGM TTY Test Set. Additional equipment was installed in 1971 and included two AN/FRT-74, one R-1051B/URR, and one CAQ1-700A (U.S. Navy Station History 1970:1-4).

In 1972 COMNAVCOM directed that NRFT, Chollas Heights cease operations on 15 November 1972 for a period of 60 days to evaluate the West Coast HF coverage without the support of the Station. This was later extended to a period of 120 days to end on 15 March 1973. New equipment installed included two AN/FRT-74, two An/SRC20.

During the 1980s, the Station contracted with outside contractors, including Radio Corporation of America (RCA) to run the transmitting and maintenance operations on the facility.

During the 1980s, the Station continued its transmitting function and participation in fleet activities. By 1992, the decision had been made to cease the transmitting activities due to financial considerations and the more improved facilities at other locations. The towers are still fitted with aircraft warning lights which is their only remaining function at the time of the HAER documentation. The base has two operational functions at the time of the study. The AMCC Communications Van assembly takes place in Building 39 and the shop facilities function as maintenance shops.

ARCHITECTURAL EVALUATION OF CHOLLAS HEIGHTS NAVAL RADIO TRANSMITTING FACILITY

The decision to build the Naval Radio Station (T), Chollas Heights was based on the nation's defense needs at a time when the world situation was rapidly changing. The combination of the unstable political climate and the development of new and exciting technology that would enhance the United States' military options led the U.S. Navy into far reaching decisions. The need for bases that could accommodate the emerging technical developments in radio, aviation, and related fields was coupled with the desire of the Navy to maintain a defense position on the West Coast. The development of bases in the Pacific and the emerging role of the United States as a world leader created a strong incentive for the Navy to create a sizable presence on the western edge of the country.

The actual design and construction of a military base combined several factors - location, the type of station and its activities, the necessary support facilities for its mission to be

accomplished, climate and terrain issues, the other facilities with which it would interact, the availability of the same type of services or activities at other bases and their location relative to the new facility, and the local building materials and architectural trends. The decision to locate new bases in the San Diego area was a result of the national defense needs and the suitability of the climate and location for defense purposes. The eagerness of the local population and the resulting support for the new bases encouraged the Navy to seriously consider San Diego as a site for new facilities. Congressman William Kettner began a concerted effort to expand the military presence in San Diego and, after investigation, the Navy decided to locate two key bases in the area - Naval Radio Station (T), Chollas Heights and Naval Air Station, North Island. By 1919, the Navy continued its expansion program with the development of the Naval Training Station, the Destroyer Base and the U.S. Naval Hospital.

A look at the planning behind the development of these bases indicates that the Navy was undergoing a process of change and expansion, including a reorganization program which left gaps in the system until they had finalized their procedures. In the Historic American Buildings Survey of the U.S. Naval Hospital by William Rutledge and associates, the survey commented that:

The Navy was acquiring these components through a seemingly ad hoc process. We have not found any references to a master plan that speaks of bringing those components together to create an all-around naval base. The driving forces behind this scattering of new naval facilities were the most recent naval doctrine and technology: radio communications, torpedo boats, deployment of marine infantry for overseas operations, and naval aviation (Manley and Wade 1992: 13).

As the program for development of radio stations proceeded, the Bureau of Yards and Docks developed plans for certain technical components of the station that were duplicated at each base. For example, the same design was used for the towers at Arlington, Virginia; Chollas Heights, San Diego; Pearl Harbor, Hawaii; and Cavite, Philippine Islands. The buildings housing the equipment and personnel were developed with respect to local architectural traditions and materials.

Rutledge et al. reveal that Secretary of the Navy, Josephus Daniels, vetoed preliminary plans created by the Bureau of Yards and Docks architects because the decision to use the "English Georgian style" did not reflect the southern California heritage (Manley 1993: 14). Navy architects were clearly influenced by the trend developing in the San Diego area to use elements from the Hispanic past of the region. The Panama-Pacific Exposition of 1915 had used this theme quite successfully and sparked a tremendous interest in the Spanish Colonial heritage of California. When the Americans had arrived in large numbers to San Diego during the late 19th and early 20th centuries, they had brought their East Coast building styles with them to give them a sense of home. By the 1890s, as the restoration of the mission was underway and capturing people's attention, the heritage of California came to be seen as something special. Also, during this same time frame, the Santa Fe and Southern Pacific Railways adopted a Spanish/Mission Revival theme for their railroad depots and resort hotels, thereby popularizing the style even further (McAlester 1986: 403).

Several variations on the general Hispanic heritage theme were developed during the first three decades of the twentieth century. The Spanish Colonial, Colonial Revival, Mission,

Mission Revival, Spanish Eclectic, and Monterey styles all were developed using similar architectural elements drawing from Spanish origins and using local materials to create a mix of European colonial and an indigenous building style. By 1900, the concept was widely accepted in California and slowly filtering eastward, no doubt helping to influence Goodhue's decision to use this architectural style for the Panama-Pacific Exposition buildings. Goodhue made a conscious choice to move beyond the rather simplistic mission style and instead decided to portray the richness of Spanish culture throughout Europe and Latin America in his Spanish Colonial designs for the Exposition. After the Exposition showed the residents the range and beauty of the Spanish Colonial building style, it made sense to people to use the materials that worked well with the climate and that were part of the earth and natural resources of the area. Soon residential housing, restaurants, hotels and every style of building imaginable were being designed with adobe (or pseudo-adobe) walls, "Spanish" tile roofs, parapets, arches and inner courtyards. When the Navy looked for a suitable style for its San Diego area bases, the answer was seen everywhere (McAlester 1986: 402-433).

The architect for the Exposition, Bertram Grosvenor Goodhue, was hired by the U.S. Navy in 1917 to design the new naval aviation facility at Naval Air Station, North Island in a Mission Revival style. The decision to use this style was apparently part of a Bureau of Yards and Docks program to create an "overall plan... the purpose has been to make all the Naval Establishments at San Diego conserve the ends of taste as well as utility." (Manley 1993: 14). Further construction of Naval facilities, including the Naval Training Center, the Marine Base, Rockwell Field, and subsequent bases reflect this decision to create a coherent and integrated architectural style for the bases in the southern California region. Local architects, such as Frank Mead and Richard S. Requa, explored this design philosophy in their own work and added to the vocabulary of the style. Mead and Requa also planned the Rockwell Field complex in association with Albert Kahn, thereby adding regional insight into the overall Navy decision to use a Hispanic heritage theme in the design of the new bases (Naval Air Station San Diego Historic District National Register Nomination 1993).

California architects borrowed freely from the typical Spanish buildings, both religious and secular, and adapted the design elements to basic shapes and local materials. At times, the architectural elements found in the missions were faithfully executed in all their detail or just the opposite occurred. An element found fully developed in the mission might appear as just a hint or suggestion in a stripped down version on a new building. The Mission Revival style borrowed freely from the missions but faded from favor during the post-World War I era as architects turned to the more elaborate and diverse Spanish Eclectic style that combined elements from both Old World and New World Spanish architecture (McAlester 1986: 402-403, 418; Newcomb 1990: 24-26).

A wide variety of features can be found in these structures but all originate in a common base. Spanish architecture originally borrowed from the entire Mediterranean basin and elements of Moorish, Byzantine, Gothic, and Renaissance inspiration can be found all through the basic architectural vocabulary. Basic elements found in buildings that are part of the whole Hispanic heritage group include mission-shaped dormers or roof parapets, red tile roof coverings, wide overhanging eaves, porches supported by large piers, a wide range of uses and styles of arches, wall surfaces usually made of smooth stucco, and ornamental landscaping to enhance the basic design of the building. Overall designs can be asymmetrical or symmetrical, pleasing facades and design elements are found equally in

both designs. Typically the facade details are imposed on a simple square or rectangular form and then elaborated from that point (McAlester 1986: 402-433; Newcomb 1990:24-26).

Roofs can commonly be hipped, gabled, flat or a combination of styles with parapets that can be either extremely simple or incredibly elaborate or any variation in between. Roof detailing commonly reflects the varied roof forms of Spanish villages. Typical roof tiles are either Mission style, shaped like half-cylinders, or Spanish style, shaped in an S-curve. Dramatically carved wooden doors with ironwork provide an entrance focal point and the entrance way can be enhanced with spiral columns, stonework, or patterned tiles. Doors are paired many times and lead to gardens, balconies and secluded patios. Often there is a large focal window with smaller multipaned windows that vary in size, shape and placement around the facade, adding interest points to rather blank wall spaces. Decorative detailing runs to patterned tiles, quatrefoil windows, mission-bell towers, carved stonework, arches, arcade walkways, fountains and gardens (McAlester 1986: 402-433; Newcomb 1990:24-26).

The Mission Revival style had already established the validity of the Spanish heritage as an architectural form and when the Navy was looking for a suitable regional architectural style for their new San Diego area bases, one had already been established that would fit their needs admirably. The first of these new bases to be built was Naval Radio Station (T), Chollas Heights and, when construction plans began, the influence of the Exposition's impact was already being felt in the San Diego area. The beauty of the Exposition grounds and buildings in Balboa Park drew great interest and certainly must have suggested to Navy architects that the Spanish heritage theme was more than just a whim of the moment and would be an appropriate style to explore for the buildings at Chollas Heights. Navy architects were influenced by the appropriateness of the style for their new facilities and in turn, helped to firmly establish the continuance of the style by building bases that would play a prominent role in the life of the region for the next seven decades and beyond.

Elements of San Diego's Spanish heritage are used extensively at the Chollas Heights facility. The buildings are grouped around a central common area in a basic square shape, reminiscent of the pueblo/town layout present in the creation of the presidio at San Diego and the pueblo of Los Angeles. The technological buildings are grouped on two contiguous sides of the square while the residential quarters are located on the opposite two sides of the complex. The buildings included the power house, the helix house to house the helix coil, support buildings and residential buildings for the commandant, the chief operator, the married operators, and a barracks for the single personnel and the Marine guards. Over the years additional buildings were constructed, some were destroyed and the original layout has been altered in some ways but the basic plan is still intact and quite visible.

The major operational and residential buildings were constructed of reinforced concrete finished in buff-colored stucco. The low pitch roofs with bracketed eaves were covered with "Spanish" or red clay tile. Building 1, the power house reflects the most extensive use of the Hispanic vocabulary with its arched parapet on the front. The building is most reminiscent of Mission Revival style train depots. The station at Chollas Heights represents the first unified application of regional architectural themes combined with the latest technological advancements by the United States Navy.

Landscaping for the base was also carefully planned and designed to increase the visual appearance of the base. The base was located in a somewhat remote area on the edge of the city proper and the base personnel who resided at Chollas Heights were rather limited in their recreational opportunities. The base was designed with plantings that were intended to enhance the structures, continue the regional theme and provide a pleasant environment for the people who worked, and lived, on the station.

The plants were organized within the station along a linear format for the most part and usually lined the roadways, formed a pleasing perimeter around each of the residences, and were laid out along the fence lines as both partial barrier and view enhancement from inside the complex. Due to the underground antenna system and the towers, the plantings outside of the complex of buildings were spaced more widely and more informally. Even though the plantings were more informal outside the work/residential areas, they still conformed to a prescribed pattern and were not arranged randomly. Instead they were grouped in clusters of seemingly natural arrangements. This added a more casual air to the open areas which were used for recreation, in contrast to the more formally arranged residential and working portions (Planting General Plan 1925).

Plants and shrubs included in the planting scheme were:

<i>Acacia armata</i>	Kangaroo Thorn
<i>Acacia baileyana</i>	Bailey Acacia/Mimosa
<i>Acacia cultriformis</i>	Knife Acacia
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia florabunda</i>	
<i>Acacia nollissima</i>	Black Wattle
<i>Acacia melanoxylon</i>	Black Sage
<i>Adelia rupestris</i>	
<i>Audibertia polystachya</i>	White Sage
<i>Cassia artemisioides</i>	Feathery Cassia
<i>Ceanothus armoreus</i>	California Wild Lilac
<i>Ceratonia siliqua</i>	St. Johns Bread
<i>Cercocarpus betuloides</i>	Mountain Mahogany/Mountain Ironwood
<i>Coprosma baueri</i>	New England Holly/Mirror Plant
<i>Cotoneaster horizontalis</i>	Rock Cotoneaster
<i>Cupressus sempervirens</i>	Italian Cypress
<i>Eriobotrya japonica</i>	Loquat
<i>Erythea armata</i>	Blue Palm
<i>Eucalyptus cornuta</i>	Yate Tree
<i>Eucalyptus corynocalyx</i>	Sugar Gum
<i>Eucalyptus ficifolia</i>	Scarlet Flowering Gum
<i>Eucalyptus polyanthemus</i>	Silver Dollar Gum
<i>Eucalyptus sideroxylon</i>	Red Ironbark
<i>Grevillea robusta</i>	Silk Oak
<i>Grevillea thelemanniana</i>	Hummingbird Bush
<i>Heteromeles arbutifolia</i>	Christmas Berry
<i>Lonicera periclymenum</i> var.	Woodbine
<i>Melaleuca hypericifolia</i>	Bottle Brush
<i>Melaleuca leucadendra</i>	Cajeput Tree
<i>Olea europaea</i>	Olive

Phoenix canariensis

Pinus insignis

Pinus pinea

Pinus unidis

Pittosporum tobira

Pittosporum undulatum

Prunus ilicifolia

Quercus dumosa

Rhamnus californica

Rhus integrifolia

Rhus ovata

Rutaceae

Rutaceae

Schinus molle

Spartium junceum

Verbenaceae

Washingtonia filifera

Canary Island Palm

Monterey Pine

Italian Stone Pine

Tobira

Victorian Box

California Wild Cherry/Hollyleaf Cherry

Scrub Oak

Wild Coffee/Coffee Berry

Lemonade Berry

Sugar Bush

Lemon/Eureka

Orange/Washington Navel

California Pepper Tree

Spanish Broom

Lantana Variegated

California Fan Palm

BUILDING DESCRIPTIONS

Introduction

The 73 acre complex at Chollas Heights consisted of several different structures with varying functions. Each played a role in the operation of the base at various points in time. Buildings have been added and some have been demolished over the years but the main buildings that were created as part of the original base layout and system of operations have remained. Some alterations have taken place to make the buildings more functional but the changes have not compromised the integrity of the buildings to a point where their historicity has been lost.

The original seven buildings - Building 1, Building 2, Towers 1, 2, 3, Quarters A and Quarters B - were constructed by the Jacobs Construction Company. The building project began on September 6, 1915 and was completed on March 6, 1916 (Navy specification no. 2149).

By 1921 the base consisted of the following components:

<u>Building No.</u>	<u>Function/Use</u>	<u>Construction Date</u>
Building 1	Power House	1915-16
Building 2	Operating Building (later incorporated into Building 1)	1915-16
Building 3	Garage	1918-21
Building 4	Carpenter Shop	1918
Building 5	Condenser House	No date
Building 6	Pump House	No date
Building 7	Blower House	1920
	Water Tank	1915
	Towers 31, 32, 33	1915-16
Quarters A	Commanding Officers	1915-16
Quarters B	Chief Operators	1915-16
Quarters C	Married Operators	1918
Quarters D	Married Operators	1918
Quarters E	Bachelor Operators	1915-16
Quarters F	Marine Barracks	1918

A. BUILDING 1 (1915-16)

Building 1, the Transmitter Building, was the most important building on the base (Figures 4 and 5). It was the center of all the activities as transmitting information was the main mission of the facility. The most important equipment, the transmitter and related equipment were placed in this building. All the cables and the antenna system connected to the equipment in this building and all the other structures on the base were aligned to support the activities within this building.

The building varies from one to one and one half to two stories, depending on the portion. The building is a fine example of the Mission Revival style and serves as the stylistic anchor point for the base. The Building 1 as it stands today combines two original structures, Building 1 and Building 2. The two structures were joined by a 60' single story

Figures 4

FIGURE NOT AVAILABLE
See field records for details

Building 1 Power House

Some items have been removed from the formal documentation for this structure because:

- the item is registered or otherwise protected under the 1976 Copyright Act as amended and thereby ineligible to enter the public domain as formal HABS/HAER documentation
- the copyright status of the item is not possible to establish due to a lack of sufficient bibliographical information in the formal documentation

• These items may include--but are not limited to--photographs, prints, drawings, letters, maps, unpublished manuscripts, photo albums, theses, dissertations, books, and periodicals.

Figure 5

FIGURE NOT AVAILABLE
See field records for details

Some items have been removed from the formal documentation for this structure because:

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addition constructed in 1920. The southern portion of the building is the original transmitter building and the northern portion was originally Building 2. With the joining of the two structures, an irregular T-shaped, asymmetrical floor plan was created. The building has a smooth-plastered stucco exterior, painted buff to match the other buildings on the base. The roof on the two original portions is red, Mission style tile. The roof on the original two story portion of Building 1 is mansard style with a wide eave overhang and exposed eaves with notched rafters. The one story portion of Building 1 has a parapet serving as a front for a front gabled roof and a tiled shed roof extension over the entrance. The roof on Building 2 is a side gabled, red Mission style tile design with a medium to steep pitch and exposed eaves. The overhang is moderate and a tiled shed roof extension has been placed over the front entrance. The portion that was added to connect the two buildings has a flat roof with no parapet. Another small extension on the west side has a shed style roof.

The doors to the structure vary in size, shape and placement depending on which section they are in. The original doors on Building 1 are wooden double doors with four lights in the upper portion of the door. The doors are placed centrally on the facade of the one story portion and offset to the east on the two story portion. The doors on the other areas are usually single wooden doors, set in pairs or used singly, and are placed at irregular intervals and conform to the needs of the interior spaces. There is a large wooden door, that swings upward, with five small square windows set in a horizontal band across the center portion of the door on the east side. A concrete ramp leads up to the door.

The windows on the structure also vary in size, style and placement but are primarily symmetrical, at least on the original portions. Windows flank the main entrance on the one story portion of Building 1 and are placed in a more diverse, but still formal, arrangement on the two story portion of Building 1. The windows are rectangular with wooden surrounds and have multiple lights. The windows on Building 1, the one story portion, are identical in size; the windows on the front facade of Building 1, the two story portion, vary in size and are placed in different patterns. The windows on the Building 2 portion are rectangular, aluminum double hung sash replacements, with wooden surrounds that are placed in two horizontal rows around the lower and upper portions of the building. The windows in the connecting one story portion are large squares with multiple lights.

Various additions have taken place over the years. A single story concrete block addition with no windows and a shed style roof used for housing additional equipment was added in 1928. This portion contains the large garage style door. The other addition is a single story, with a shed roof, corrugated steel addition on the west side of Building 1, the original portion.

B. BUILDING 2 (1957)

Building 2 was constructed in 1957 and is located to the east of Building 1 (Figure 6). The current Building 2 is the second Building 2. The original Building 2 has been incorporated into Building 1 (see Building 1 discussion). The second Building 2 is considered to be a contributing element to the historic district and housed the "helix" or transmitter tuning device. Several pieces of historic equipment related to the connection between the transmitter and the antenna were in the building but were removed prior to the time of the HAER study. The one story building was constructed of poured concrete and contained one set of steel double doors on the north facade. The doors are placed at the lower left

Figure 6

FIGURE NOT AVAILABLE
See field records for details

Building 2 Helix House

Some items have been removed from the formal documentation for this structure because:

- the item is registered or otherwise protected under the 1976 Copyright Act as amended and thereby ineligible to enter the public domain as formal HABS/HAER documentation
- the copyright status of the item is not possible to establish due to a lack of sufficient bibliographical information in the formal documentation

These items may include--but are not limited to--photographs, prints, drawings, letters, maps, unpublished manuscripts, photo albums, theses, dissertations, books, and periodicals.

corner of the north facade. A small vent is present on the north facade in the upper right quadrant. The building displays no overt architectural style and is essentially a large rectangular box. The building is strictly functional in appearance with no decorative elements. No windows are present. The building is rectangular with a flat roof and is 20' high. At the rear of the structure is a tripod and a collection of weights designed to secure the bottom end of the antenna. The tripod area is fenced with chain link fencing with a quadruple row of barbed wire running along the top. A metal ladder has been attached to the east side of the building to provide access to the roof area. A group of twelve large electrical cables runs from the ground at the north side of building across a series of wooden poles to Building 1 (Figure 7). There is no landscaping around the exterior except scrub brush.

C. BUILDING 4 (1918)

Building 4 was constructed in 1918 and functioned as a utilitarian shop building (Figure 8). The building has no overt building style but is strictly of standard military construction for support structures. The building appears to have been designed from a standard set of Bureau of Yards and Docks plans and no architect was found for the structure. It does not display elements of the Mission Revival theme found elsewhere on the base.

Building 4 housed the carpenter shop, paint shop and garage. The one story building is eight feet high and is 40' x 20', a total of 800 square feet. No records regarding cost or building plans were available. The rectangular building has a wood frame, galvanized corrugated steel walls and a low pitch, side gabled steel roof. The east end of the structure has a pair of double wood sliding doors. The doors are placed side by side and comprise the entire facade except for the triangular area above the doors. The north or front facade has a single wooden door placed slightly off center to the right. The north or front facade has two rectangular windows placed on either side of the door. The windows have six lights placed in two horizontal rows. The windows have wooden surrounds and are devoid of ornamentation. The building has been painted a buff color and the paint is peeling and needs maintenance.

D. BUILDING 22 (1942)

Building 22 was constructed during World War II in 1942 (Figure 9). The building displays some very minimal Mission Revival design elements. The flat parapet roof and the square simple mass of the two story portion suggest the most basic elements of the Mission Revival style taken to its most elemental forms.

The building is composed of two basic portions arranged in an L-shape. The main portion of the structure is a two story square that contains offices and work areas. The extended portion is single story with five swinging double wooden garage doors and wooden frames. The exterior facades have smooth plastered walls painted the same buff color as the rest of the buildings. The building roof is comprised of two different styles. On the two story portion, the roof is flat with a slight parapet. On the single story portion, the roof is side gabled with a medium to steep pitch. The roof is red asphalt shingled with a shallow eave overhang. The doors on the structure are wood framed and are simple, utilitarian, single wooden doors set in pairs. The garage doors have windows with six multiple lights in the upper portion and are placed in an evenly spaced row across the front facade of the single story extended portion. The doors open into bays and work areas on

FIGURE NOT AVAILABLE
See field records for details

Some items have been removed from the formal documentation for this structure because:

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Figure 8

FIGURE NOT AVAILABLE
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Building 4 Storage/Shop

Figure 9

FIGURE NOT AVAILABLE
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Building 22 Shop

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the interior. The square two story portion has a pair of single wooden doors that match the other five sets of doors on opposing sides of the building and they are located at the extreme south end of the square portion on the east and west facades. The north and south facades contain a single wood door with wooden surrounds and a transom with six lights that matches the same height of the windows. These doors are placed off center on the facades.

The windows on the building are placed symmetrically around the facade. The square portion has windows placed in two rows on the first and second floors on the north and east facades. The windows on the lower level are double hung sash wood windows, with wooden surrounds and divided into twelve lights. The windows were evenly spaced across the facades, however, many of the windows appear to have been covered over so the original symmetry of the facade has been destroyed. The windows on the upper portion are also evenly spaced on the east facade and are divided into three vertical sections of aluminum sliders. The windows on the upper floor are only present on the east facade. Large L-shaped water drainage systems are present on the north and south facades and break up the large expanse of blank wall space. The windows on the extended single story portion are present on the north and west walls. The rectangular windows on the north wall are double hung sash wood windows, with wooden surrounds and divided into twelve lights. The windows are evenly spaced across the facade. There is one single window, centered, on the west wall. The rectangular window is identical to the windows on the other walls.

The building has had a small storage area constructed on the west wall and the storage area covers a portion of the single window on that wall. The storage area is a crude construction of corrugated steel siding with a slightly sloped roof of asphalt shingles and is clearly constructed of leftover building materials. The building is surrounded by asphalt parking areas and has a few bushes scattered around the south wall of the facade.

E. BUILDING 13 (1928)

Building 13, Recreation Building, has no overt architectural style and is a strictly utilitarian corrugated steel building (Figure 10). The rectangular building has a wood frame, with a medium pitch roof with new asphalt shingling. The building has been remodeled which resulted in the removal of a doorway on the north end and the addition of a door and a short protective overhang on the west side. The building is painted the same buff color as the other buildings on the base. The windows on the building are large rectangular windows with wooden surrounds and are aluminum double hung sash style. The windows have six lights and are placed at regular intervals across the facades with the exception of the remodeled areas. The windows are the dominant feature on the building and comprise the bulk of the west facade. Doors are single wooden doors that are placed next to each other on the front facade.

F. BUILDING 15 (1931)

Building 15 is a wood framed, corrugated steel clad utility building painted the same buff color as the other structures (Figure 11). The building has no overt building style and consists of two several sections in an irregular, asymmetrical floor plan. The main portion is a basic rectangular with an long extended rectangular section added at the south end. The steel sheet roof contains several sections - front gabled portion and the rest of the sections

Figure 10

FIGURE NOT AVAILABLE
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Figure 11

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are either flat with a small parapet at the south end or shed roof over the open storage areas. The main entrance to the building is centered under the front gable portion of the building and consists of double corrugated steel doors with no windows. The north section of the building has open walled storage areas for hazardous materials. Small doors, some are wood and some are steel, are present on the north side providing access to interior areas and storage compartments. Only two windows are present on the structure, one on the rear wall on the east side and the other on the south wall. The windows are square with wooden surrounds. The building has no landscaping and is surrounded by asphalt.

G. BUILDING 18 (1944)

Building 18 is a small, rectangular, single story, wood framed, corrugated steel shed located adjacent to the west leg of Tower 33 (Figure 12). The building has no overt building style and was constructed during World War II as an additional storage facility from basic Bureau of Yards and Docks plans. No architect or building plans were found for the structure and it may possibly have been moved onto the base from another location.

The building has a front gabled roof with red asphalt shingles and a slight eave overhang. The building has a single wooden door placed in the center of the east facade. A window is present on the south facade. The window has a wooden surround and has louvered panes of glass. The building has been used for storage of various materials and is strictly a utilitarian structure with no architectural or historical merit.

H. and I. QUARTERS A (1915-16) and Garage

Quarters A and the associated garage were the original commanding officer's quarters (Figures 13 and 14). The quarters buildings were constructed in the Mission Revival architectural style and anchor the base on the west side. The quarters are placed in a horizontal row along the 700 foot stretch of the street. Quarters A is the largest and most elaborate of the five residential structures, as would be befitting the highest ranking officer's status on the base.

The residence is a one and one half story with a basement, rectangular building with a large rear extension and a detached one car garage. The building is 57' x 33' with a concrete foundation. It was built at a cost of \$6000.00. The building has a wide, low pitched Mission tile roof with two gable dormers with notched exposed-rafter overhangs. The roof has side gables and the exposed rafters are stained a dark brown. The woodwork on the house is painted brown and the walls are stuccoed and painted the same buff color. A smooth plastered chimney rises from the center of the roofline.

The building is symmetrical in design with a raised wooden porch centered on the front facade. The porch has a wooden stairway with seven steps at the center of the porch for access to the front entrance. The front facade also has a small staircase on the south side of the front porch area, but it is simpler in design and simply provides an alternative access to the porch. The supports on the porch rise up to meet the sloping roof that extends downward to form the roof for the porch and the front area of the building. The north portion of the front facade has a large window and living area extension which forms a type of bay at the edge of the porch. The porch has been enclosed on the left front with the walls forming a small extra room. This additional room was added behind the original porch railings. The porch is raised on large piers for support.

Figure 12

FIGURE NOT AVAILABLE
See field records for details

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Building 18 Storage Shed

Figure 13

FIGURE NOT AVAILABLE
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Quarters A Officers Quarters

Figure 14

FIGURE NOT AVAILABLE
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The east end of the building has a wooden staircase that leads to an upper portion of the building. The staircase is intrusive but necessary. The rear of the building has an L-shaped porch area that extends along two contiguous walls of the main portion of the house and the rear extension. Entrance into the service areas of the house is gained by a short flight of wooden stair (seven stairs) onto a wood landing. A single wooden door with multiple lights leads into the kitchen area. In the same area as the wood staircase is a small concrete staircase that leads down to a basement area.

The windows in the residence are basically rectangular in shape with wooden surrounds. The windows have been replaced by aluminum frame windows in a double hung sash style. A large single pane window dominates the "bay" area on the front of the home.

Located immediately behind the house is a small one car garage. The garage is wood horizontal shiplap siding, painted white with brown wood trim. The building has no overt style and is a simple, functional, utilitarian structure. The garage has a slightly sloping flat roof with a band of brown painted wood at the edge of the roof line. The garage has a large wooden door that swings upward. One window is present on the structure on the south facade. The window has a wooden surround and has multiple lights. A concrete driveway leads to the garage.

Alterations to the quarters were done by de Waard & Cobham Company. The alterations were started in May 1922 and finished in December 1922 at a cost of \$4,090.00.

The property was landscaped to enhance the residence with large trees, including eucalyptus, pine and palm trees. Grass was originally placed around the house and a small inner garden is present between the garage and the back of the house. The garden is enclosed by a six foot high wooden fence made of horizontally placed cedar boards painted brown. Little of the original planting remains, except possibly the mature trees.

J. QUARTERS B

Quarters B was the Chief Operators' quarters and provided space for two operators to live in separate quarters (Figure 15). The building was constructed in 1915-1916 at a cost of \$4500.00. The Mission Revival style building is 62' x 27' and has a concrete foundation with a basement. The one story rectangular duplex has a smooth stucco exterior and a side gable, red Mission tile roof. The front facade has a large front gable centered on the building which serves as a dividing point between the two duplexes. Three smooth plastered chimneys are evenly spaced across the roof line. One chimney is in the center placed in line vertically with the point of the gable and the other two are placed equidistant from the ends of the gabled roofs horizontally along the spine of the roof. The front facade has two wooden porches on raised concrete piers at both the left and right sides to provide access to the separate entries. The front entrances are single wooden doors with small rectangular windows placed to the outside of the door. The roof of the house extends downward to form a shed style roof over the porch.

The windows on the house vary in size, style, and placement around the facade. They have wooden surrounds but the original windows have been replaced with aluminum sliders. The two windows placed on the front of the house below the center gable have wooden window boxes.

Figure 15

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The rear of the house features two separate porches and two separate entrances for each family. The porches on the rear are not enclosed and the roof extends down over the porch in a shed roof style. The roof extends only over the porch section and does not continue for the entire length of the lower edge of the roof line. The porches are raised on concrete piers. The back entrances are single wooden doors with a glass portion at the top of the door. The access to the basement area is placed between the two porches and consists of a small metal railing surrounding a short flight of concrete stairs.

Landscaping around the house is similar to the other buildings. Wide lawns provide a green buffer filled with large mature eucalyptus, palm, pepper and oak trees. The trees are probably the only portion of the original remaining plantings. There are no garages or other buildings associated with the structure.

K. QUARTERS C

Quarters C and D, Married Operators quarters, were constructed in the Mission Revival style and were constructed from the same plans (Figure 16). The buildings were constructed from June to September 1918 at a cost of \$7,700 each by the Louis A. Geisler Company with plans drawn by the Bureau of Yards and Docks. The Mission Revival style building is 62' x 27' and has a concrete foundation. The two newer buildings do not have basements, possibly reflecting a decision to make them more like the typical California architecture. The construction of basements is typically found on the East Coast and California homes rarely have them (Navy Specification No. 2903-B, 1918).

The one story rectangular duplex has a smooth stucco exterior and a side gable, red Mission tile roof. The front facade has a large front gable centered on the building which serves as a dividing point between the two duplexes. Three smooth plastered chimneys are evenly spaced across the roof line. One chimney is in the center placed in line vertically with the point of the gable and the other two are placed equidistant from the ends of the gabled roofs horizontally along the spine of the roof. The front facade has two wooden porches at both the left and right sides to provide access to the separate entries. The front entrances are single wooden doors with small rectangular windows placed to the outside of the door. The roof of the house extends downward to form a shed style roof over the porch.

The windows on the house vary in size, style, and placement around the facade. They have wooden surrounds but the original windows have been replaced with aluminum sliders. The two windows placed on the front of the house below the center gable have wooden window boxes.

The rear of the house features two separate porches and two separate entrances for each family. The porches on the rear are enclosed and the roof extends down over the porch in a shed roof style. The roof extends only over the porch section and does not continue for the entire length of the lower edge of the roof line. The porches have stuccoed walls with multipane windows extending from the roof line to the top of the small wall. The back entrances are single wooden doors with a glass portion at the top of the door.

Figure 16

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Landscaping around the house is similar to the other buildings. Wide lawns provide a green buffer filled with large mature trees. The trees are probably the only portion of the original remaining plantings. There was a garage, Building 10 for the use of the residents of Quarters C and D but it was torn down. No other buildings are associated with the structure.

L. QUARTERS D

Quarters C and D, Married Operators quarters, were constructed in the Mission Revival style and were constructed from the same plans (Figure 17). The buildings were constructed from June to September 1918 at a cost of \$7,700 each by the Louis A. Geisler Company with plans drawn by the Bureau of Yards and Docks. The Mission Revival style building is 62' x 27' and has a concrete foundation. The two newer buildings do not have basements, possibly reflecting a decision to make them more like the typical California architecture. The construction of basements is typically found on the East Coast and California homes rarely have them (Navy Specification No. 2903-B, 1918).

The one story rectangular duplex has a smooth stucco exterior and a side gable, red Mission tile roof. The front facade has a large front gable centered on the building which serves as a dividing point between the two duplexes. Three smooth plastered chimneys are evenly spaced across the roof line. One chimney is in the center placed in line vertically with the point of the gable and the other two are placed equidistant from the ends of the gabled roofs horizontally along the spine of the roof. The front facade has two wooden porches at both the left and right sides to provide access to the separate entries. The front entrances are single wooden doors with small rectangular windows placed to the outside of the door. The roof of the house extends downward to form a shed style roof over the porch.

The windows on the house vary in size, style, and placement around the facade. They have wooden surrounds but the original windows have been replaced with aluminum sliders. The two windows placed on the front of the house below the center gable have wooden window boxes.

The rear of the house features two separate porches and two separate entrances for each family. The porches on the rear are enclosed and the roof extends down over the porch in a shed roof style. The roof extends only over the porch section and does not continue for the entire length of the lower edge of the roof line. The porches have stuccoed walls with multipane windows extending from the roof line to the top of the small wall. The back entrances are single wooden doors with a glass portion at the top of the door.

Landscaping around the house is similar to the other buildings. Wide lawns provide a green buffer filled with large mature trees. The trees are probably the only portion of the original remaining plantings. There was a garage, Building 10, for the use of the residents of Quarters C and D but it was torn down. No other buildings are associated with the structure.

Figure 17

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M. QUARTERS F (1918-19)

Quarters F is a two and one half story Mission Revival style building which served originally as a Marine Barracks (Figure 18). The building was constructed by the Walter Slater Company in August 1918 and completed in January 1919 for a cost of \$25,537.60. The building is 90' x 77' with a total square footage of 9,000 square feet. The building has a concrete foundation, a wood frame with stucco and a Mission tile roof (Navy Specification No. 3130 1918).

The barracks is located on small street perpendicular to the rest of the quarters buildings. The red tile roof has three gable dormers with exposed rafter overhangs with notched edges. The building has pentagonal shaped windows located under the eaves on the ends of the building directly under the side gabled roof. The shape of the windows echoes the roof line. The most dominant feature on the front facade is a full length set of screened porches on both the top and bottom floors. The windows are large square windows which repeat the dimensions of the screens and continue the same line around the walls of the facade. The windows are wooden with wooden surrounds and consist of nine lights. The windows are placed on the ends of the building and around the rear.

The rear of the building repeats the use of screened porches but over the years, portions of the porches have been walled in. The building also has a one and one half story extension with a front gable roof, a raised, open porch with square wooden supports and a wooden railing. The roof is the same Mission style, red tile with wooden eaves with notched brackets. The windows have been replaced with aluminum sliders but were originally wooden with wooden surrounds. A single wood door is centered on the main facade of this section and a small flight of wood stairs accesses the entrance to the screen porch area.

In 1928 the building was converted from a Marine barracks into an apartment complex for four married operators. Furniture for the building cost \$3,200.00 and the construction changes cost a total of \$8,000.

N. BUILDING 14

Building 14 was a vehicle garage constructed in 1929 of stucco siding with plywood covering on the front (Figure 20). The building has no overt architectural style and no building plans or architect could be associated with the structure. The one and one half story building cost \$800.00 has a shed roof, overhead doors and openings for four entrances on both the east and west facades. The bays are open on both sides of the structure and window openings are present on the north and south facades. The frame for the building is wood and the support posts for the bay openings are also wood. The interior area has space for four cars. The floor is asphalt and the entire area around the building is surrounded with asphalt. The building was constructed after the Barracks building was turned into a four apartment complex for married couples in 1928.

O., P., and Q. TOWERS 31, 32, and 33, AND TRIATIC ANTENNA (1915-16)

The three triangular shaped 600-foot towers are spaced 1,100 feet apart (Figure 19). They do not conduct radiowaves themselves, but serve to support the triatic array antenna which is suspended between them. The towers are constructed of welded and riveted structural

Figure 18

FIGURE NOT AVAILABLE
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Quarters F Barracks

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FIGURE

20

FIGURE NOT AVAILABLE
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Building 14 Vehicle Garage

steel and were constructed from standard plans devised by the Bureau of Yards and Docks and duplicated for the base at Arlington, Virginia; Chollas Heights, California; Pearl Harbor, Hawaii and Cavite, Philippine Islands. The towers were constructed by the 12th Naval District at a cost of \$92,939.77. The foundations cost \$7,215.00. One of the major costs to be borne in connection with the towers is painting them the distinctive red and white pattern. The original cost was under \$10,000 and over the years the cost increased tenfold to over \$100,000.

The three towers have one 300-foot guyed lattice mast, two 70-foot ship masts, and one 50-foot flag pole. The tower stands on a base of three legs, approximately 200 feet tall. The legs are mounted on porcelain insulators set into massive poured concrete bases. The tops of the towers hold horizontally mounted "wings" which hold the antenna wires.

The San Diego *Union* had the following to say about the towers during their period of construction:

Three fabricated steel towers, will each be 600 feet in height, triangular in section, 150 feet in width at the base and 8 feet at the apex. The towers will be placed 1100 feet apart and will cost \$90,000. The foundations of the towers, made of reinforced concrete, cost \$7125. The phosphor bronze antennae wires, stretching between the tops of the huge masts will weigh more than a ton (1/1/16 7:8).

Modifications to the towers over the years included replacement catwalks, new ladder cages, modernized lighting, repainting. In 1930 lights were installed on the towers, in 1934 the bridge plates were renewed and in 1936 a portion of the antenna was torn out by a lowflying airplane. Very few of the overall visual and engineering characteristics have changed over the years. The basic serviceable design created by the Bureau of Yards and Docks sufficed to maintain the towers in their original form. Even though the technology changed, the purpose of the towers did not change for there was no need to change a sound, functional design.

The antennae are the heart of the transmitting station but difficult to see. A large portion of the network is nearly invisible under normal circumstances. Antennae system transmission line are set up on 18 ft. steel poles. The antennae structure also includes a buried "distributed ground system" consisting of a network of wires and rods. NAVCOMSTA Drawing RJ6D-2498 depicts the system. Changes were made in 1929, 1936, and 1957 and replacements were put in. The drawings are unclear as to how the system has changed.

R. BUILDING 26 (1918)

The Tennis Courts were constructed as part of the recreational activities used by base personnel (Figure 21). The courts are asphalt courts, resurfaced many times, and surrounded by a chain link fence. Placed at the side of the courts are two concrete double benches. No net or other related recreational materials are present.

Figure 21

FIGURE NOT AVAILABLE

See field records for details

Building 26 Tennis Court

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LAMP POSTS

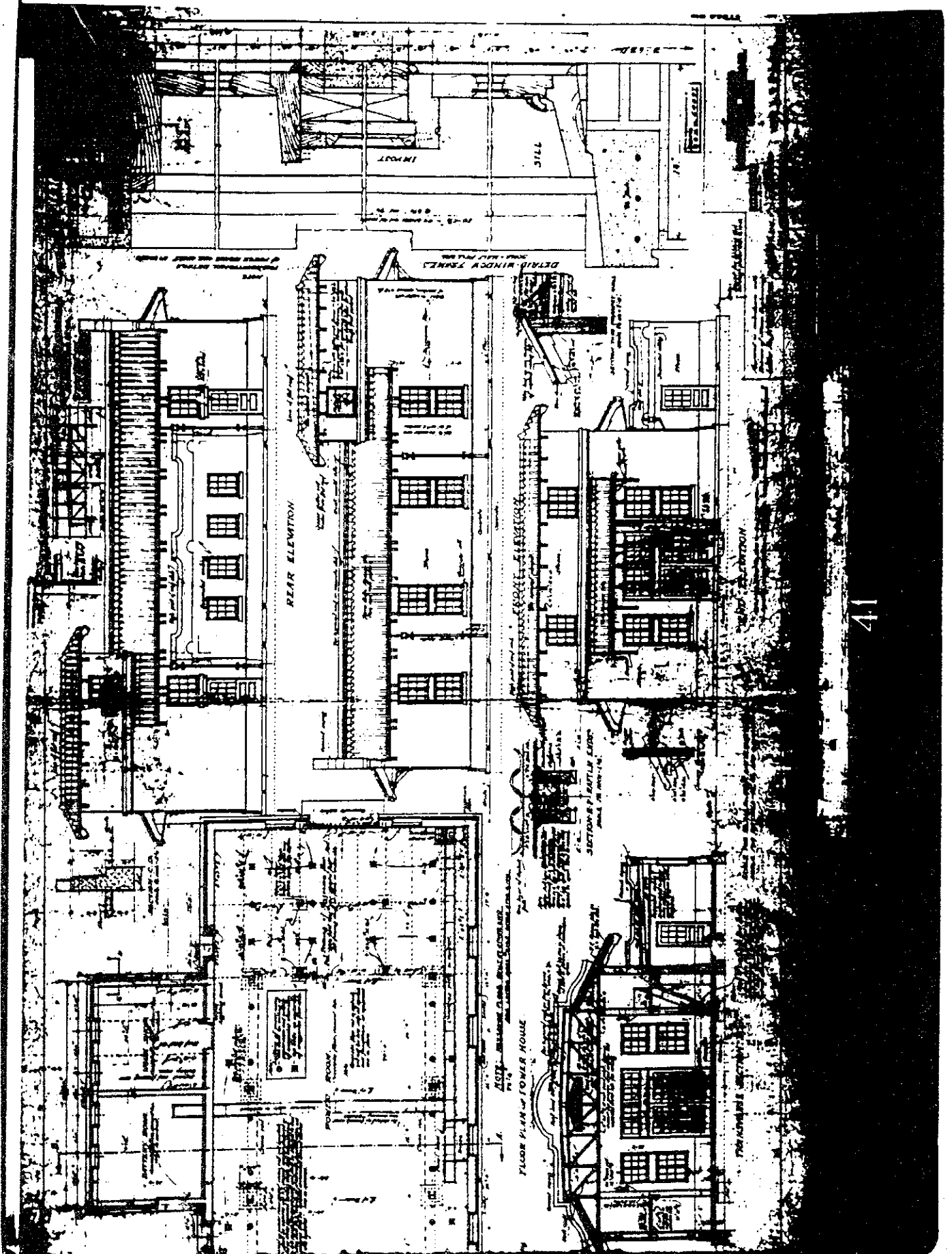
Attempts to document the lamp posts were fruitless. No lamp posts remained on the base at the time of the HAER study and no plans were found for their design at any of the archives consulted for the project.

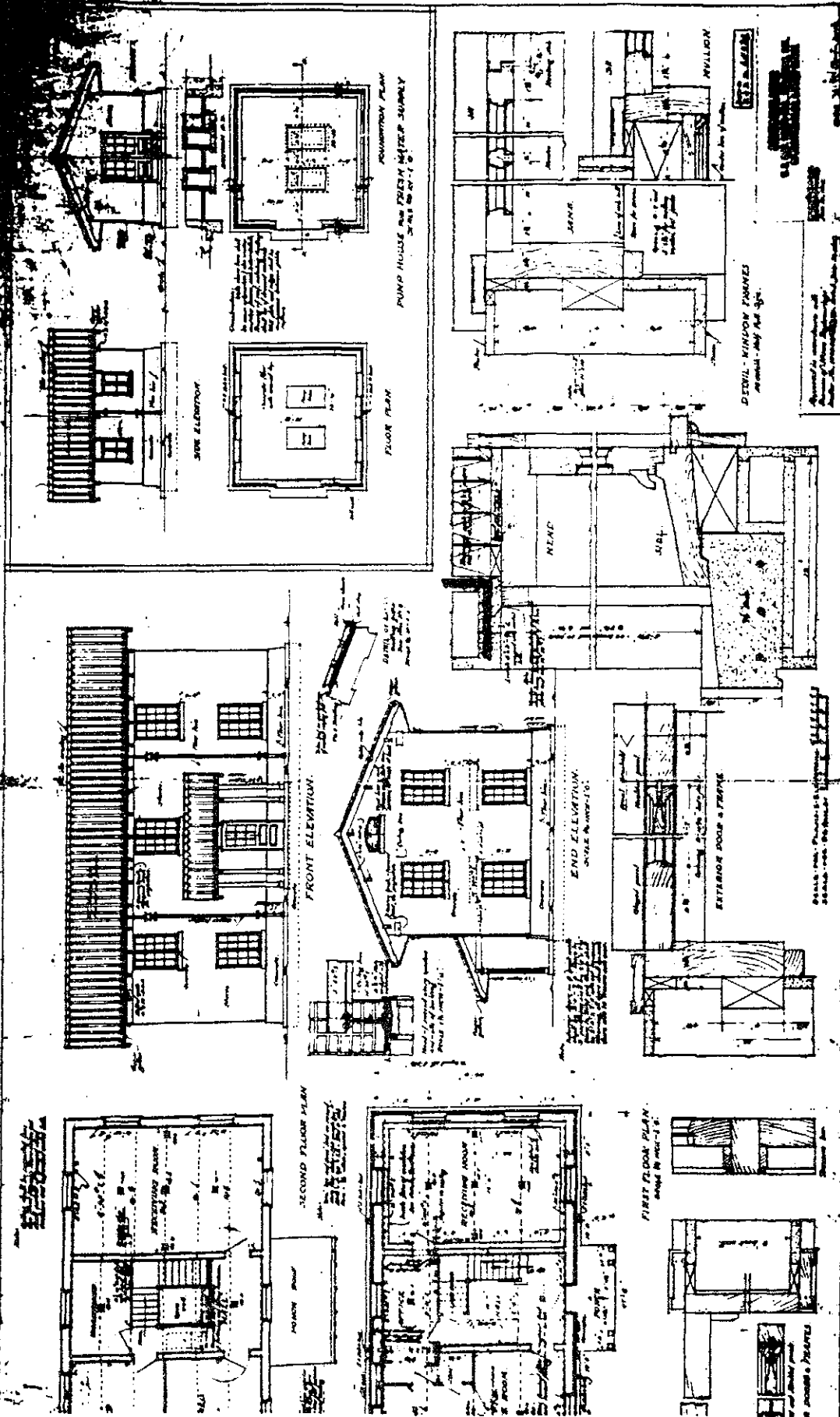
BUILDING 43 (1945)

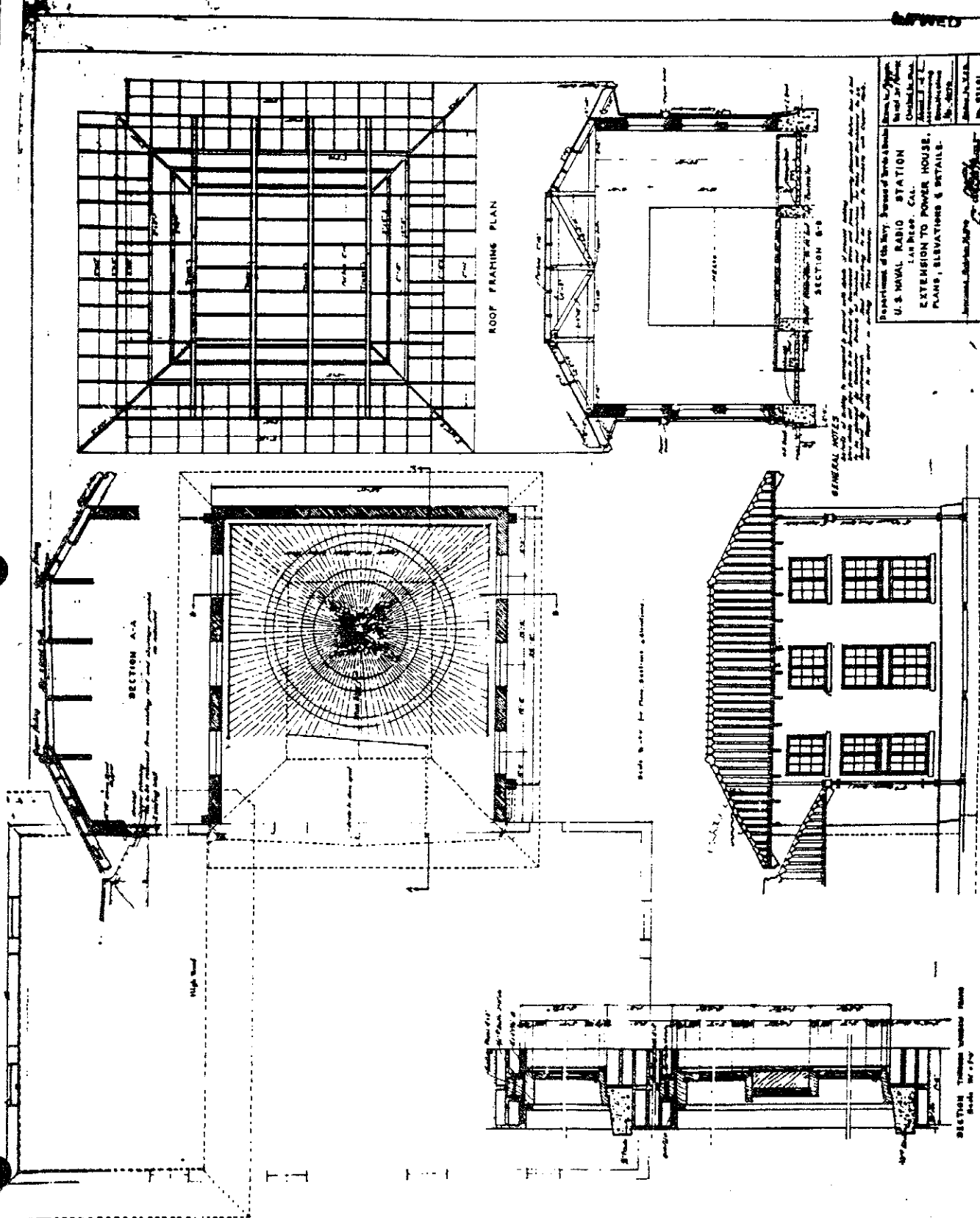
This building was listed in the Manley and Wade report as a poured concrete utility structure used as a paint locker. No building 43 remained on the base at the time of the HAER study and could not be documented. No records were found at any archives related to the structure.

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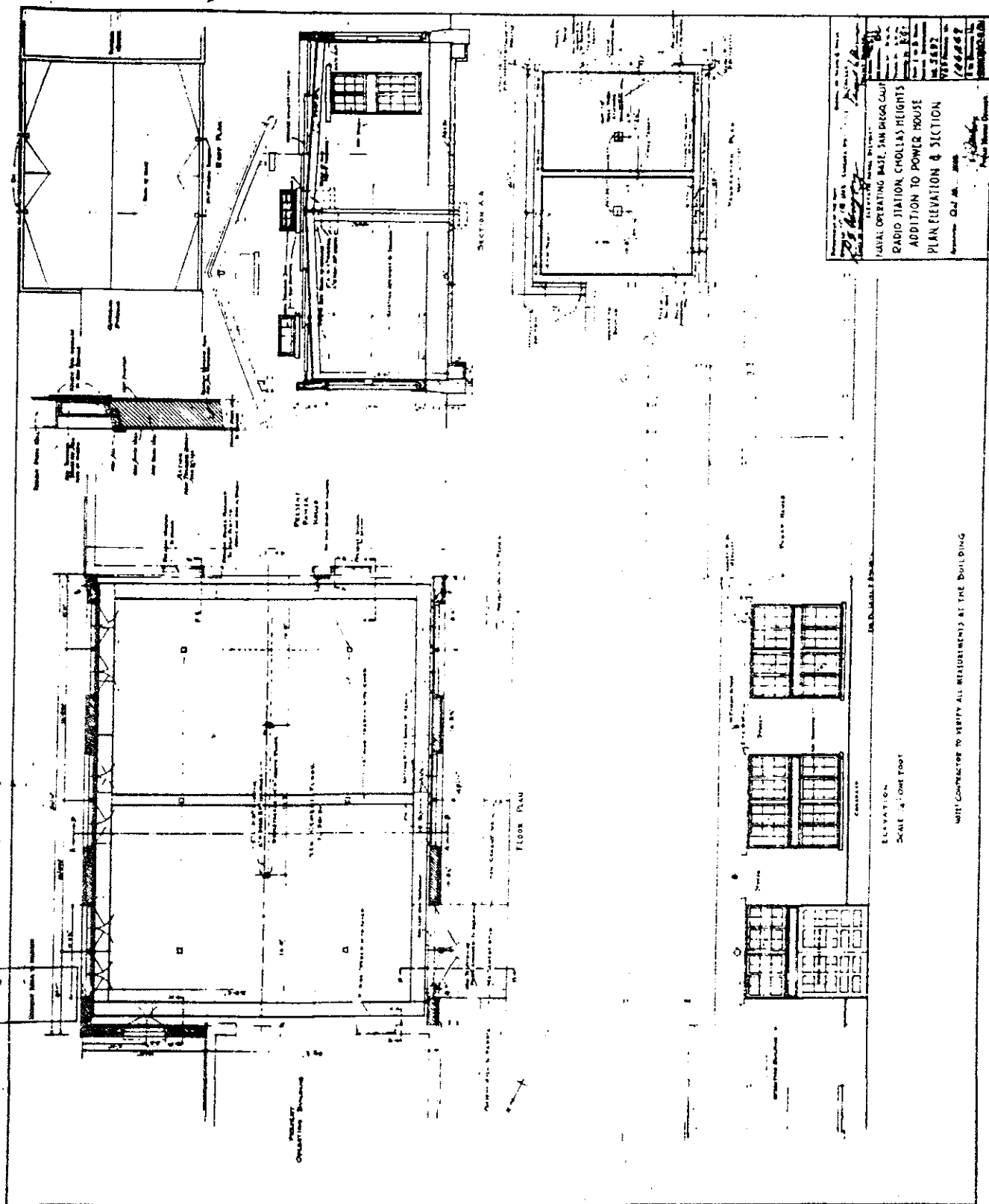
DRAWINGS Pages 53 - 75

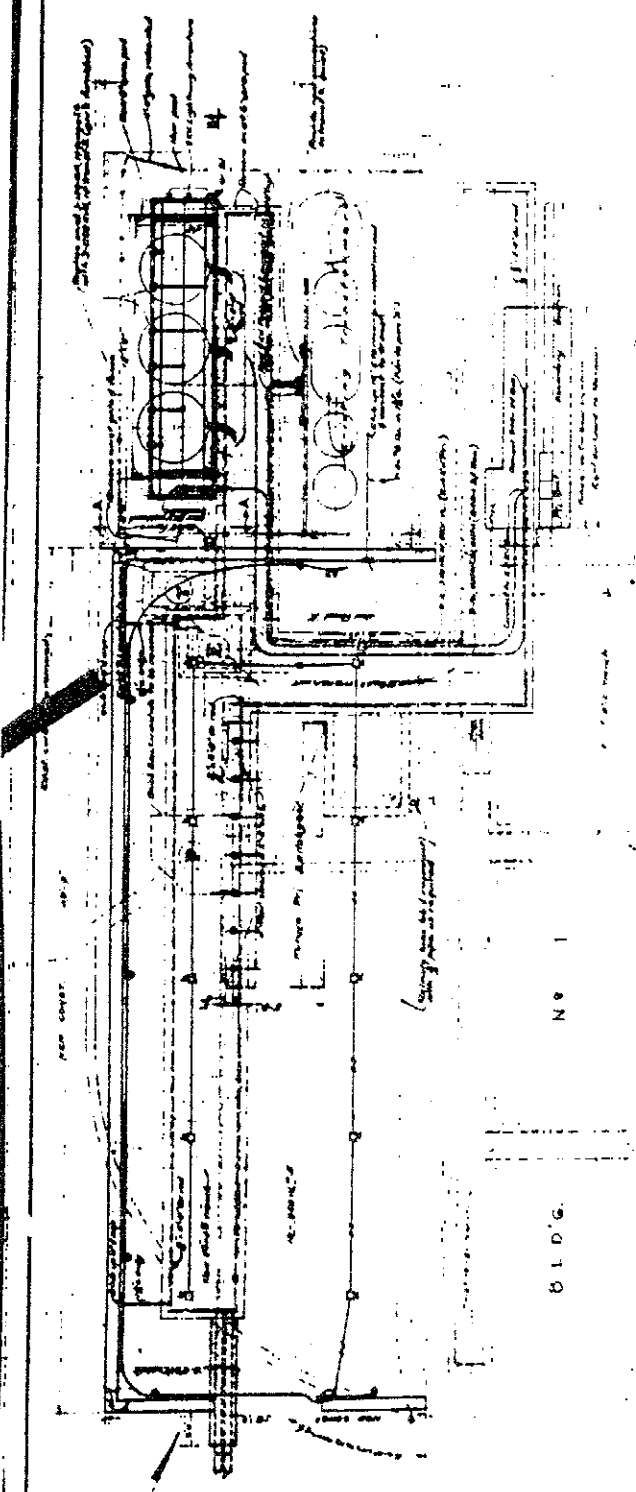




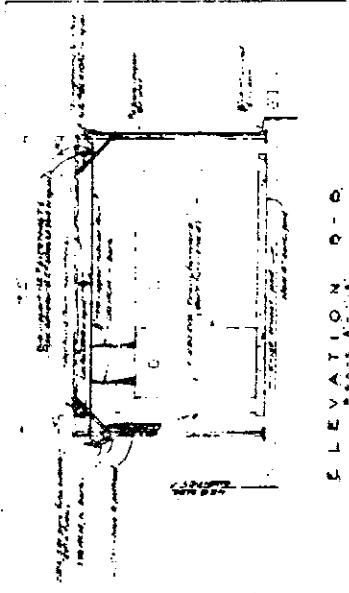


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PLAN OF ADDITIONAL BUILDING, 2nd FLOOR

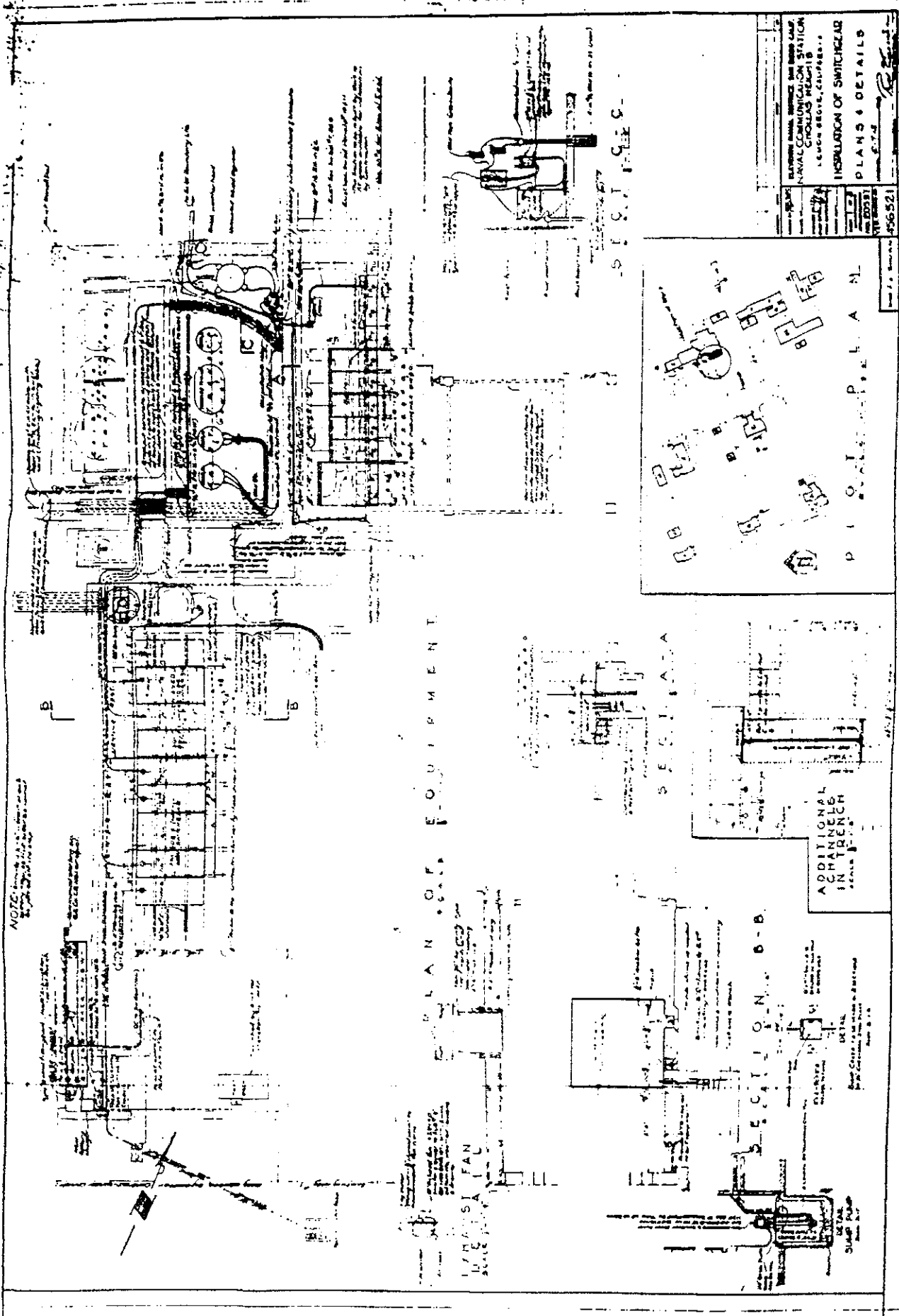


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NOTES & RECORDS

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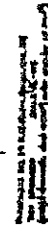
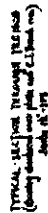
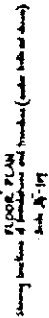
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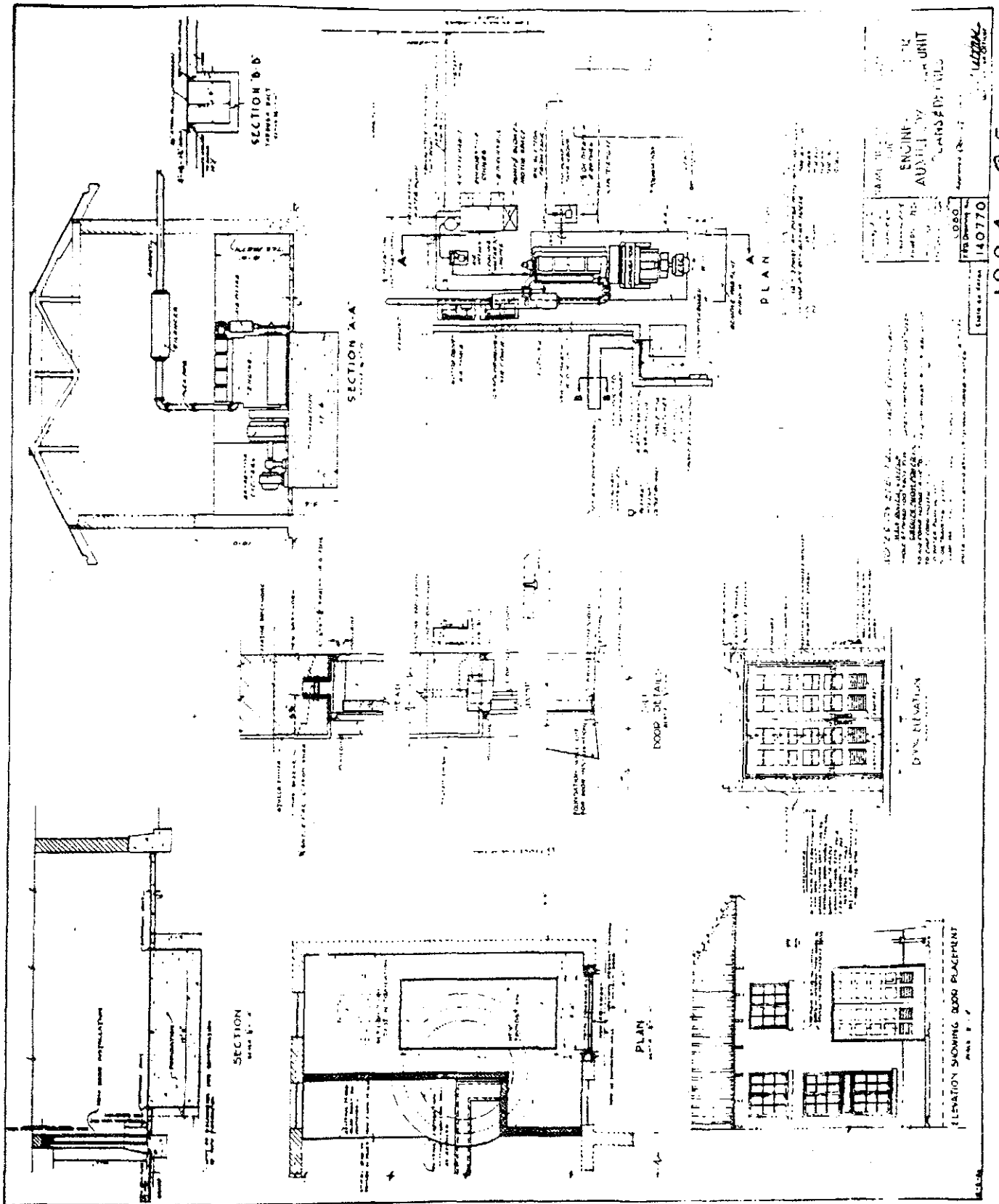
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THE UNIVERSITY OF CHICAGO

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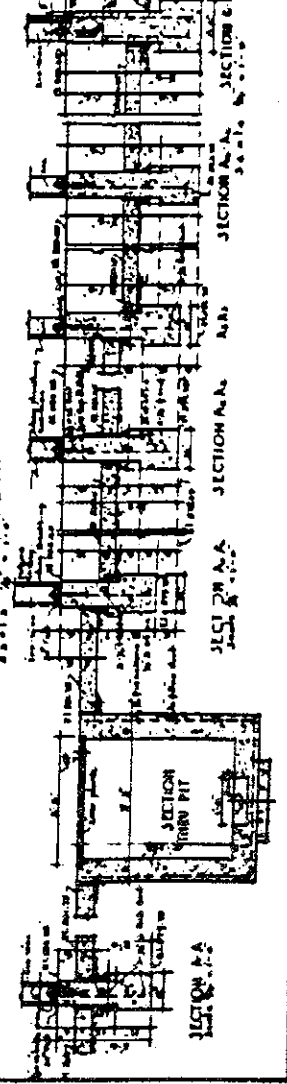
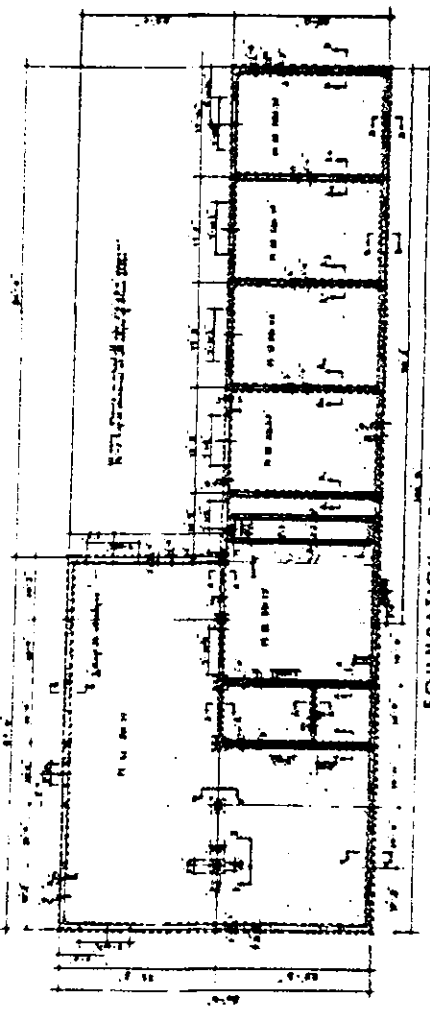
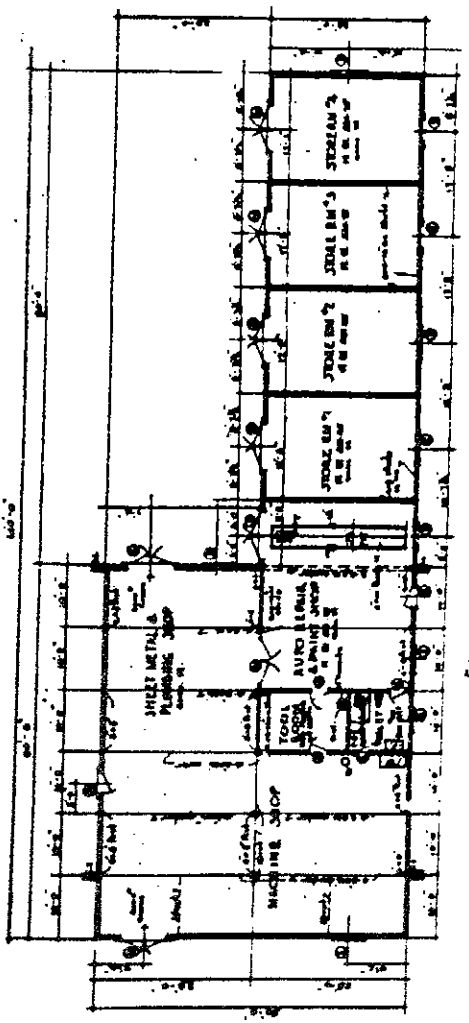


1224-25-

GENERAL NOTES
1. All dimensions are in feet and inches.
2. All work shall be in accordance with the latest edition of the California Building Code.
3. The foundation shall be designed for a live load of 100 lbs. per sq. ft. and a dead load of 150 lbs. per sq. ft.
4. The floor joists shall be 2x12 S.P.F. No. 1, spaced 16" o.c.
5. The floor shall be 4" concrete over 1/2" wire mesh.
6. The walls shall be 12" concrete block with 1/2" wire mesh.
7. The roof shall be 2" concrete over 1/2" wire mesh.
8. The exterior walls shall be finished with 1/2" stucco over 1/2" wire mesh.
9. The interior walls shall be finished with 1/2" gypsum board.
10. The ceiling shall be finished with 1/2" gypsum board.
11. The floor shall be finished with 1/2" tile.
12. The roof shall be finished with 1/2" asphalt shingles.
13. The foundation shall be finished with 1/2" concrete.
14. The walls shall be finished with 1/2" concrete block.
15. The roof shall be finished with 1/2" concrete.
16. The exterior walls shall be finished with 1/2" stucco over 1/2" wire mesh.
17. The interior walls shall be finished with 1/2" gypsum board.
18. The ceiling shall be finished with 1/2" gypsum board.
19. The floor shall be finished with 1/2" tile.
20. The roof shall be finished with 1/2" asphalt shingles.

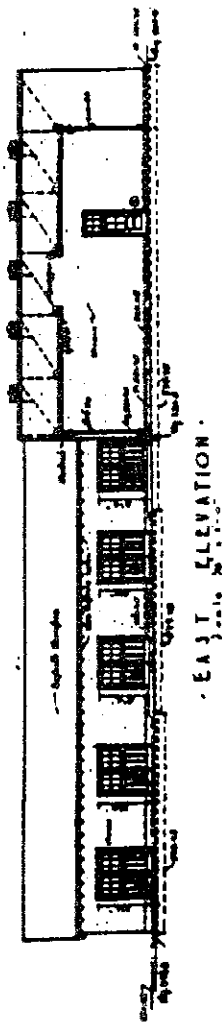
SCHEDULE	
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1	12" CONCRETE BLOCK
2	12" CONCRETE BLOCK
3	12" CONCRETE BLOCK
4	12" CONCRETE BLOCK
5	12" CONCRETE BLOCK
6	12" CONCRETE BLOCK
7	12" CONCRETE BLOCK
8	12" CONCRETE BLOCK
9	12" CONCRETE BLOCK
10	12" CONCRETE BLOCK
11	12" CONCRETE BLOCK
12	12" CONCRETE BLOCK
13	12" CONCRETE BLOCK
14	12" CONCRETE BLOCK
15	12" CONCRETE BLOCK
16	12" CONCRETE BLOCK
17	12" CONCRETE BLOCK
18	12" CONCRETE BLOCK
19	12" CONCRETE BLOCK
20	12" CONCRETE BLOCK

SCHEDULE	
NO.	DESCRIPTION
1	12" CONCRETE BLOCK
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15	12" CONCRETE BLOCK
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18	12" CONCRETE BLOCK
19	12" CONCRETE BLOCK
20	12" CONCRETE BLOCK

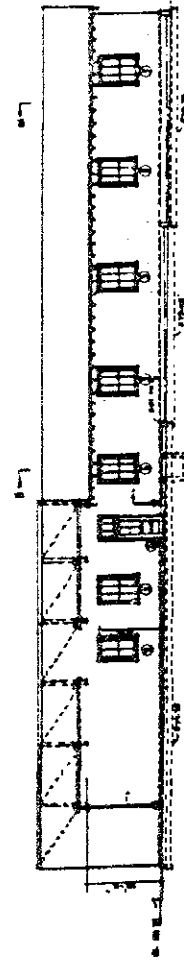


CHOLLAS HEIGHTS NRTF
UTILITIES BUILDING & OCCASIONAL
SCHEDULES, FLOOR PLANS
& FOUNDATION DETAILS

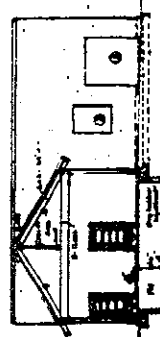
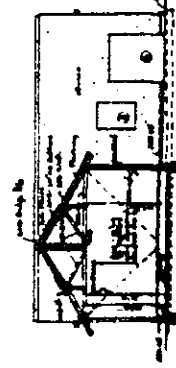
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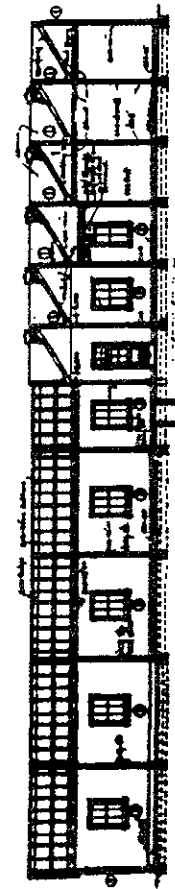
NORTH ELEVATION



SECTION N-N

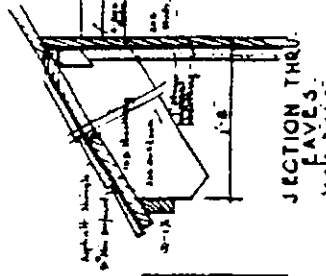
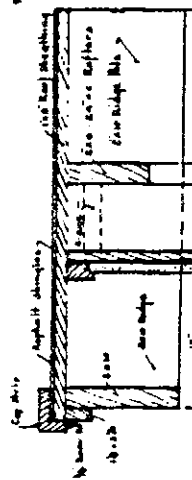


SECTION THRU STORE RM.



SECTION THRU GABLE

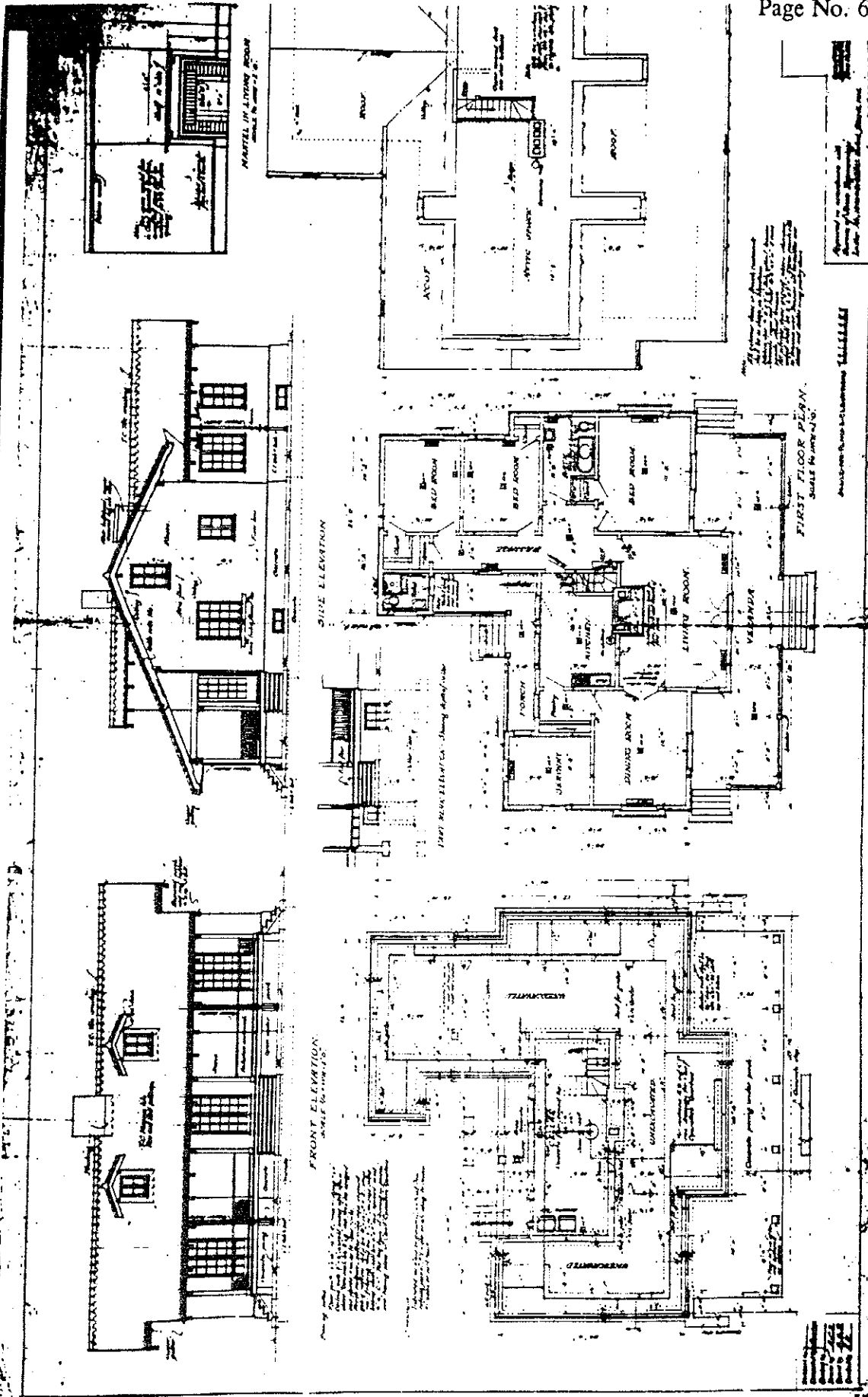
SOUTH ELEV.

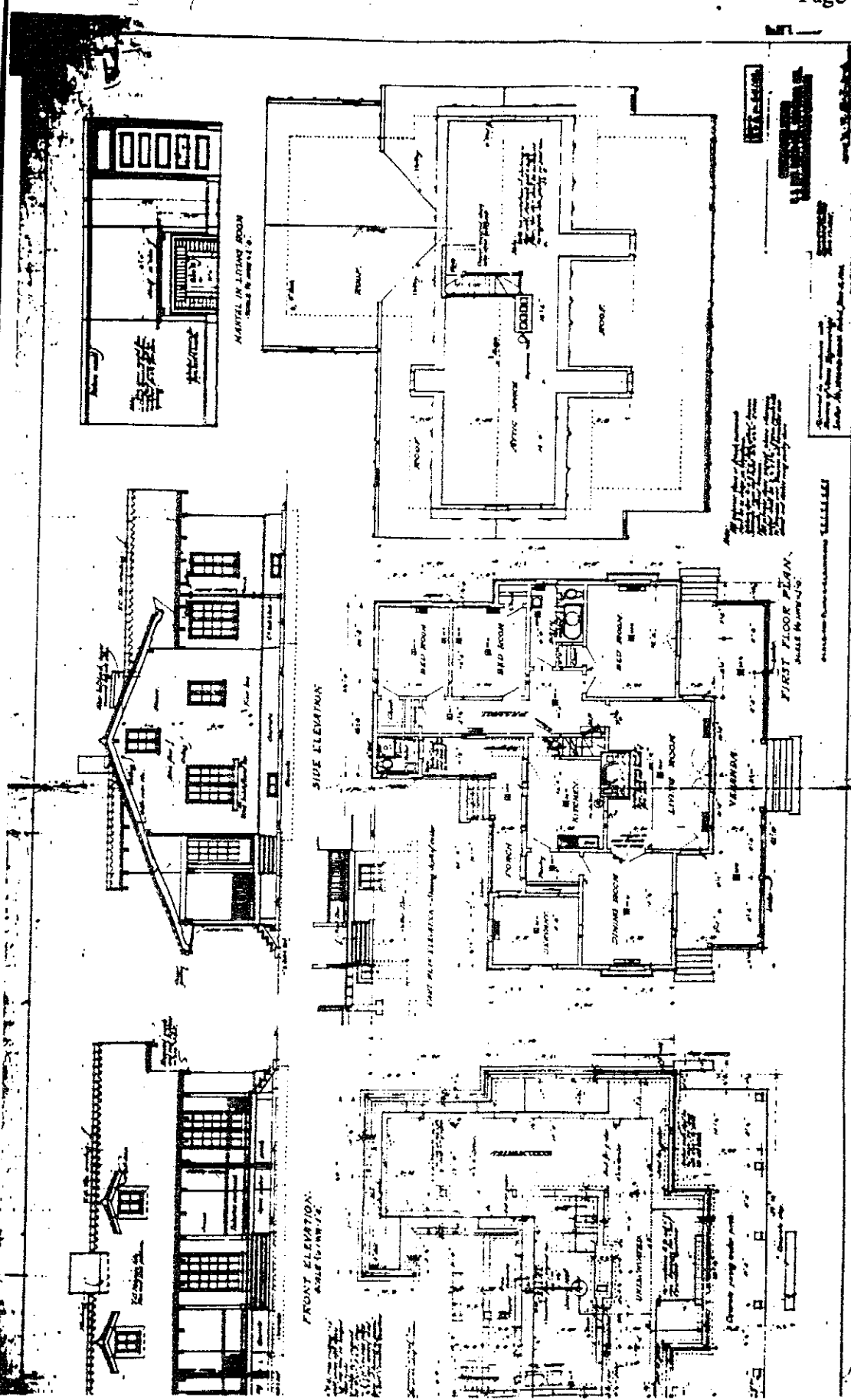


Project No.	176612
Drawn by	J. H. H. H.
Checked by	J. H. H. H.
Approved by	J. H. H. H.
Date	10/1/54

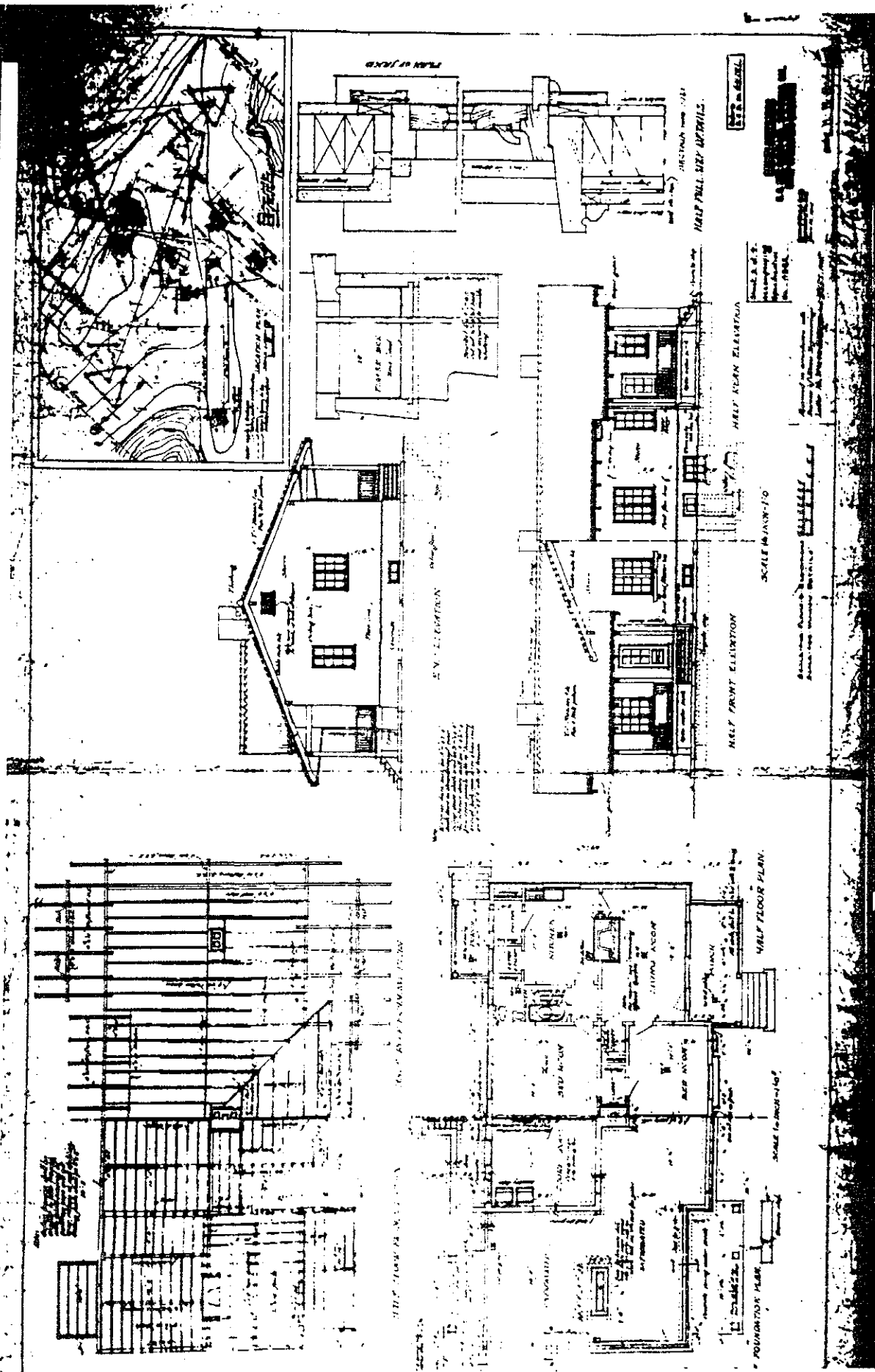
CHOLLAS HEIGHTS NRTF
CHOLLAS HEIGHTS RADIO STATION
UTILITIES BUILDING & ACCESSORIES
ELEVATIONS & SECTIONS

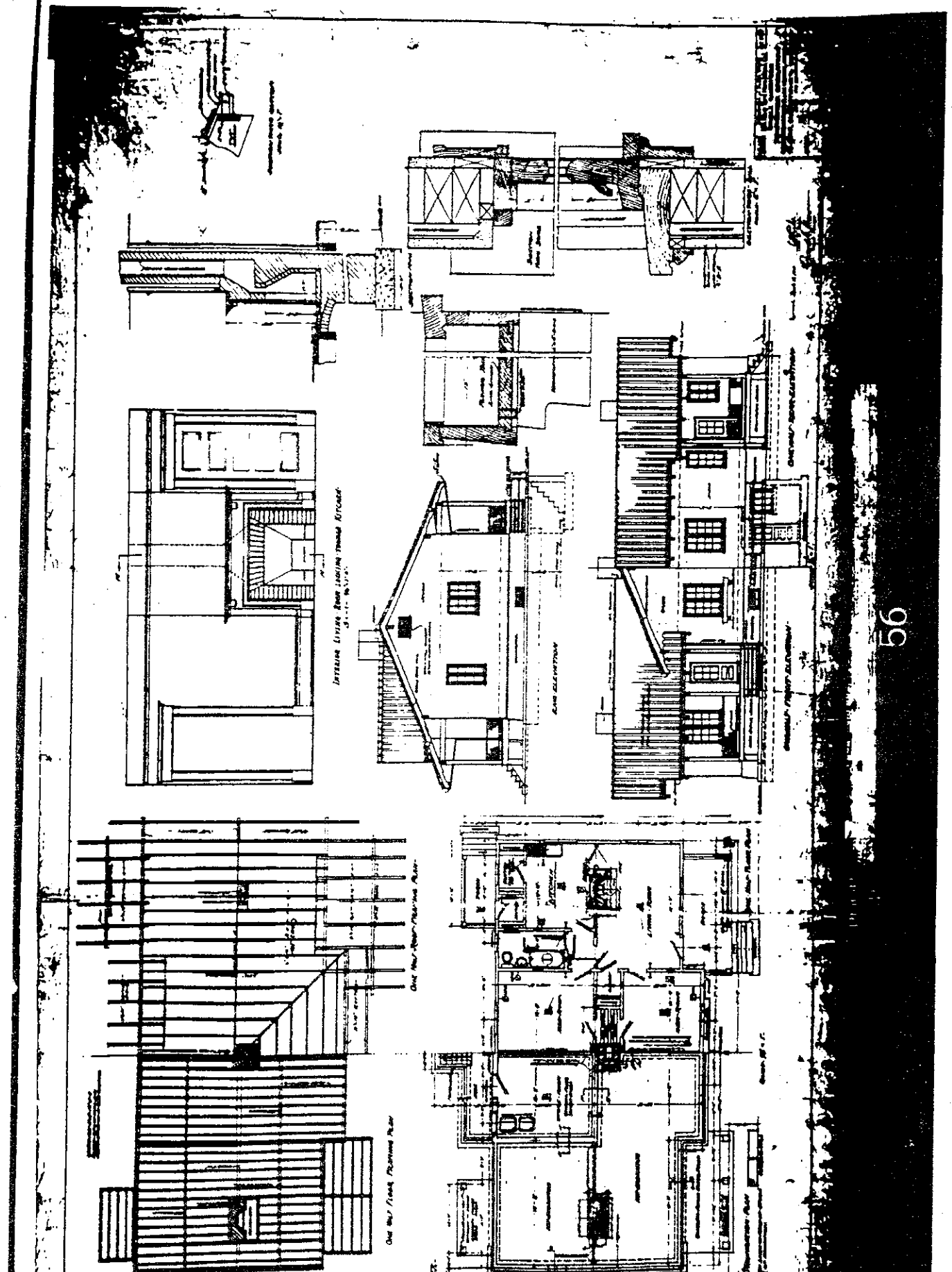
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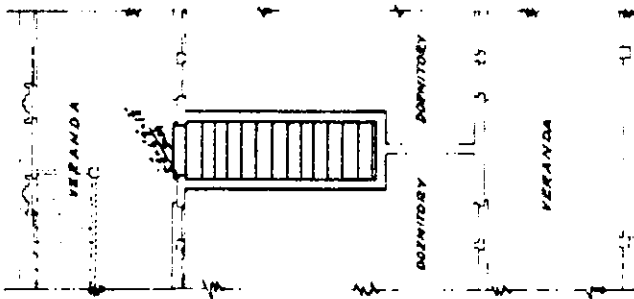




1224-23-13







2ND FLOOR PLAN
showing outside view
of building

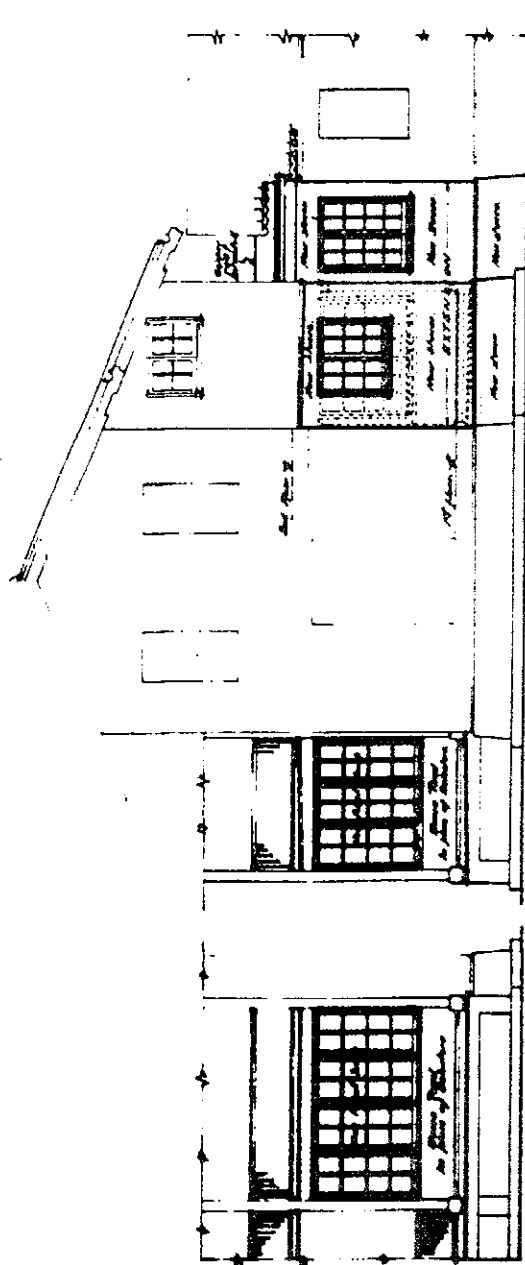
DESIGNER: M. J. A.	DATE: 10/10/50
CHECKED: A. J. B.	DATE: 10/10/50
APPROVED: [Signature]	DATE: 10/10/50
U.S. NAVY	U.S. NAVY

U.S. NAVY, SAN DIEGO, CALIF.
U.S. NAVAL RADIO STATION
CHOLLAS HEIGHTS, SAN DIEGO, CALIF.
SIMPLE OPERATOR'S QUARTERS
FIRST FLOOR PLAN
MARINE OPERATORS' TWO FAMILIES

DATE: 10/10/50
BY: 12/1/51

RM - 21F-307

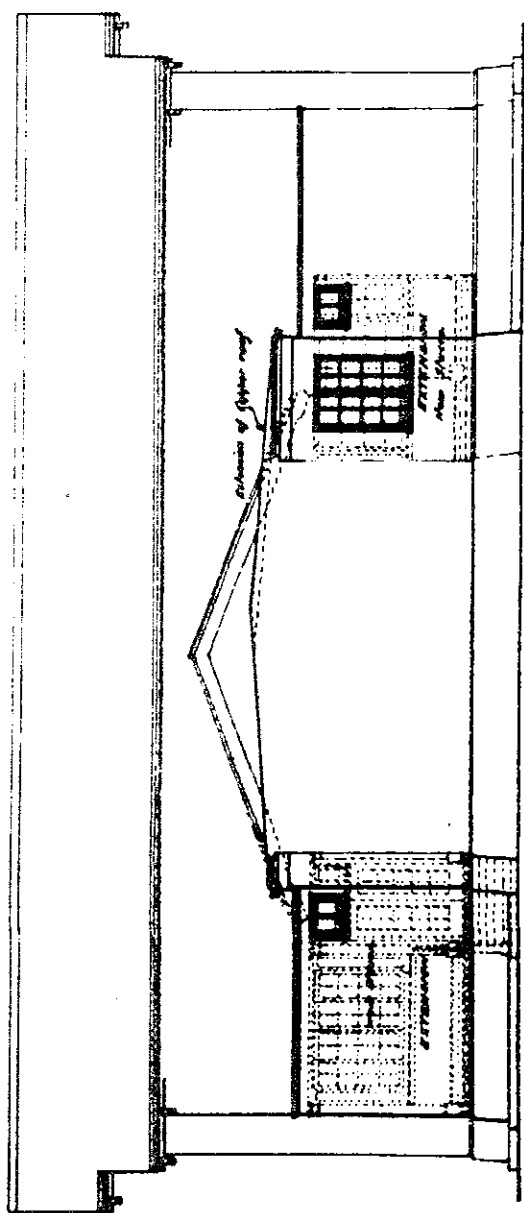
10/10/50



FRONT ELEVATION

DATE: 10/10/50

FRONT ELEVATION



SIDE ELEVATION

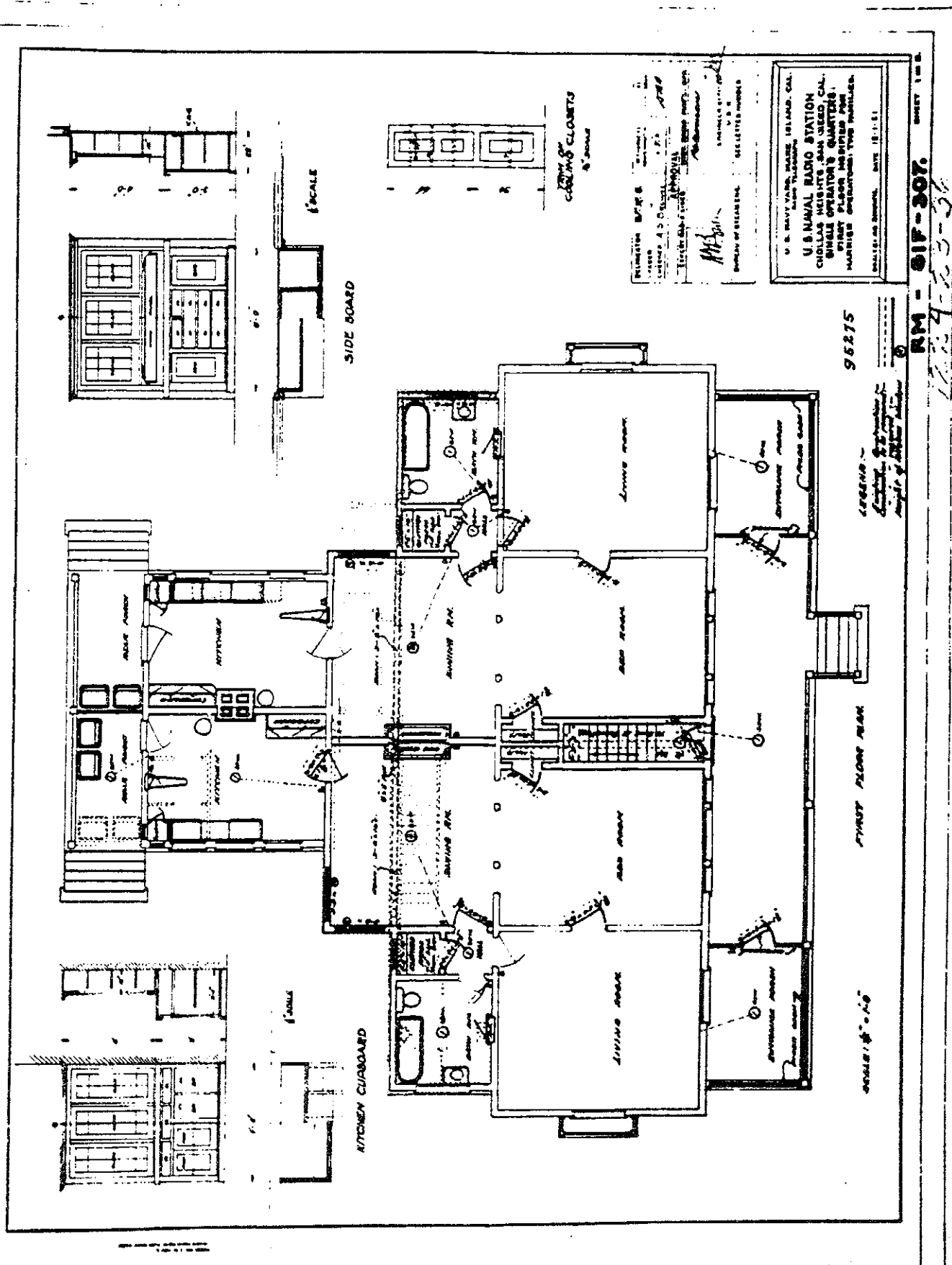
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SIDE ELEVATION

95275

RM - 21F-307

10/10/50



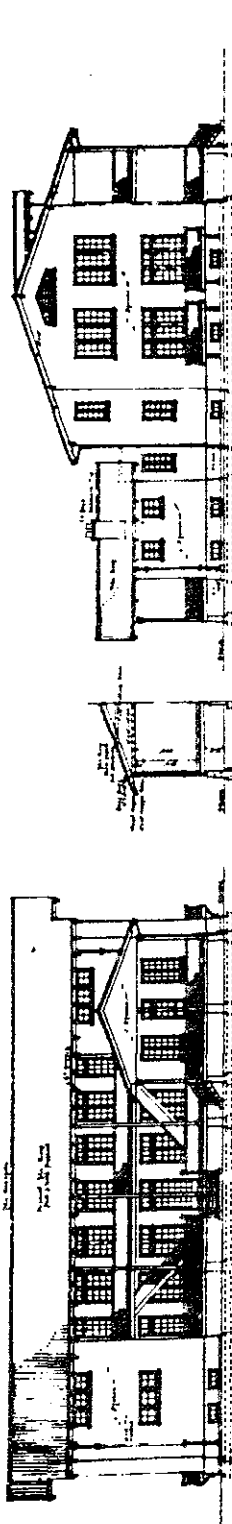
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 CHECKED BY: [Signature]
 APPROVAL: [Signature]
 DATE: [Date]
 U.S. NAVAL RADIO STATION
 CHOLLAS HEIGHTS, SAN DIEGO, CAL.
 SINGLE OPERATOR'S QUARTERS
 FIRST FLOOR PLAN
 DRAWING NO. 4572-01

RM - 61F-307

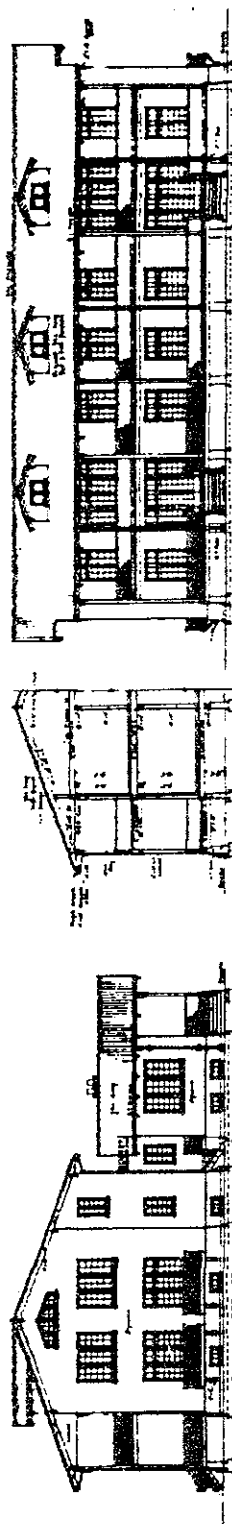
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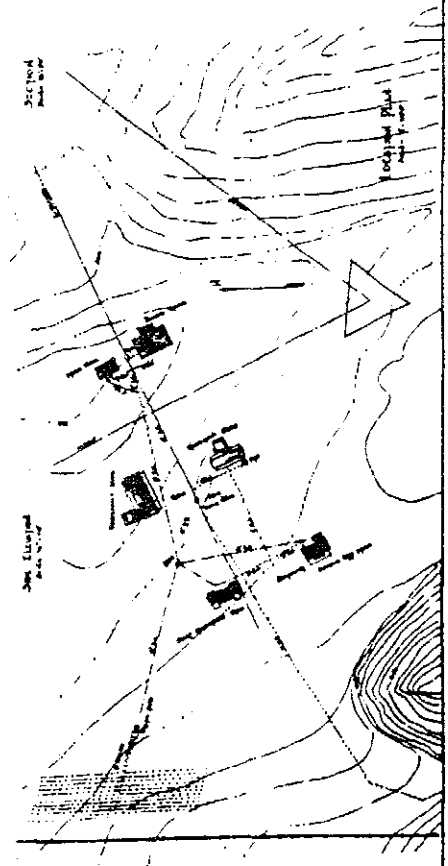
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John Cleveland



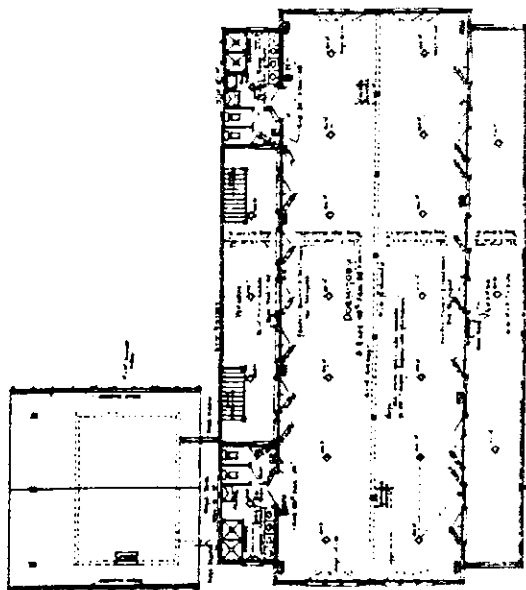
Only 14 in 100



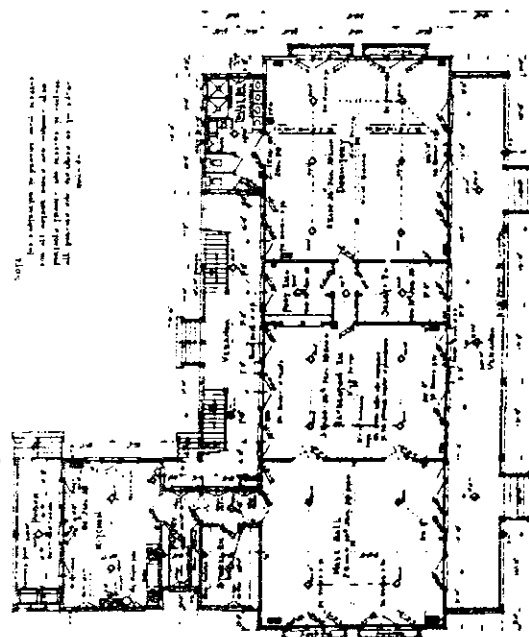
problem 5

Department of the Navy	Director of Naval Facilities	Issued by Authority
U.S. NAVAL RADIO STATION, SAN DIEGO, CALIF.	BARRACKS BUILDING	Issued by Special
Eleventh, Twentieth & Locust Street		Contractor's Signature
Approved: <i>[Signature]</i>		Special Agent
		SP-3120
		Expiry: 140320
		R. F. Jones

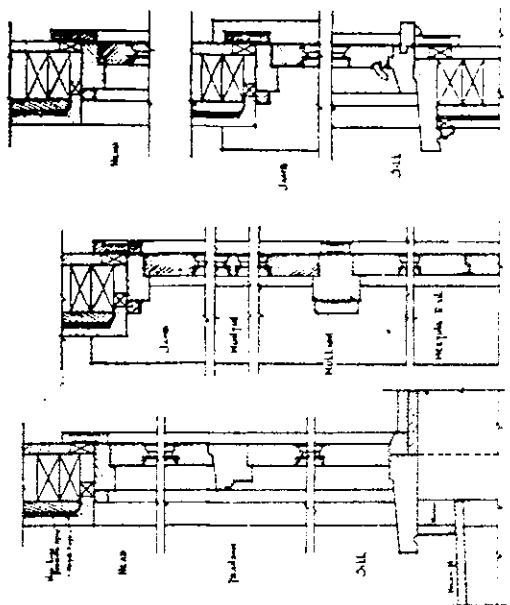
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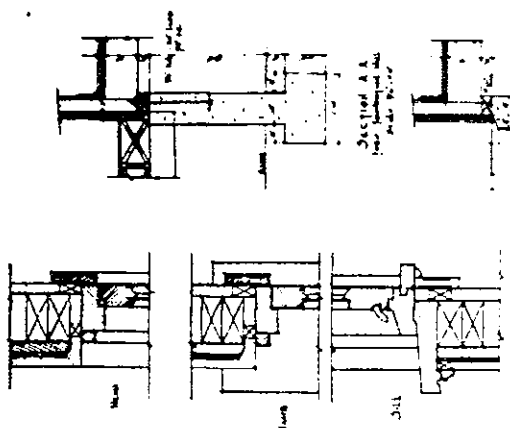
Second Floor Plan
Scale 1/8" = 1'-0"



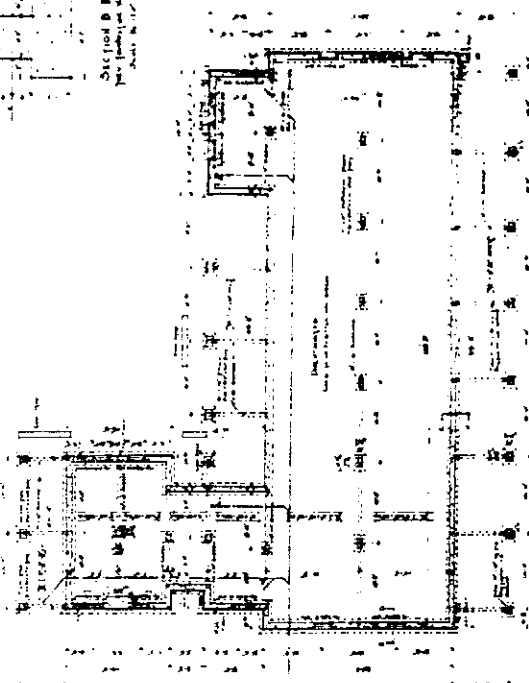
First Floor Plan
Scale 1/8" = 1'-0"



Detail of Fusible Doors
Scale 1/8" = 1'-0"



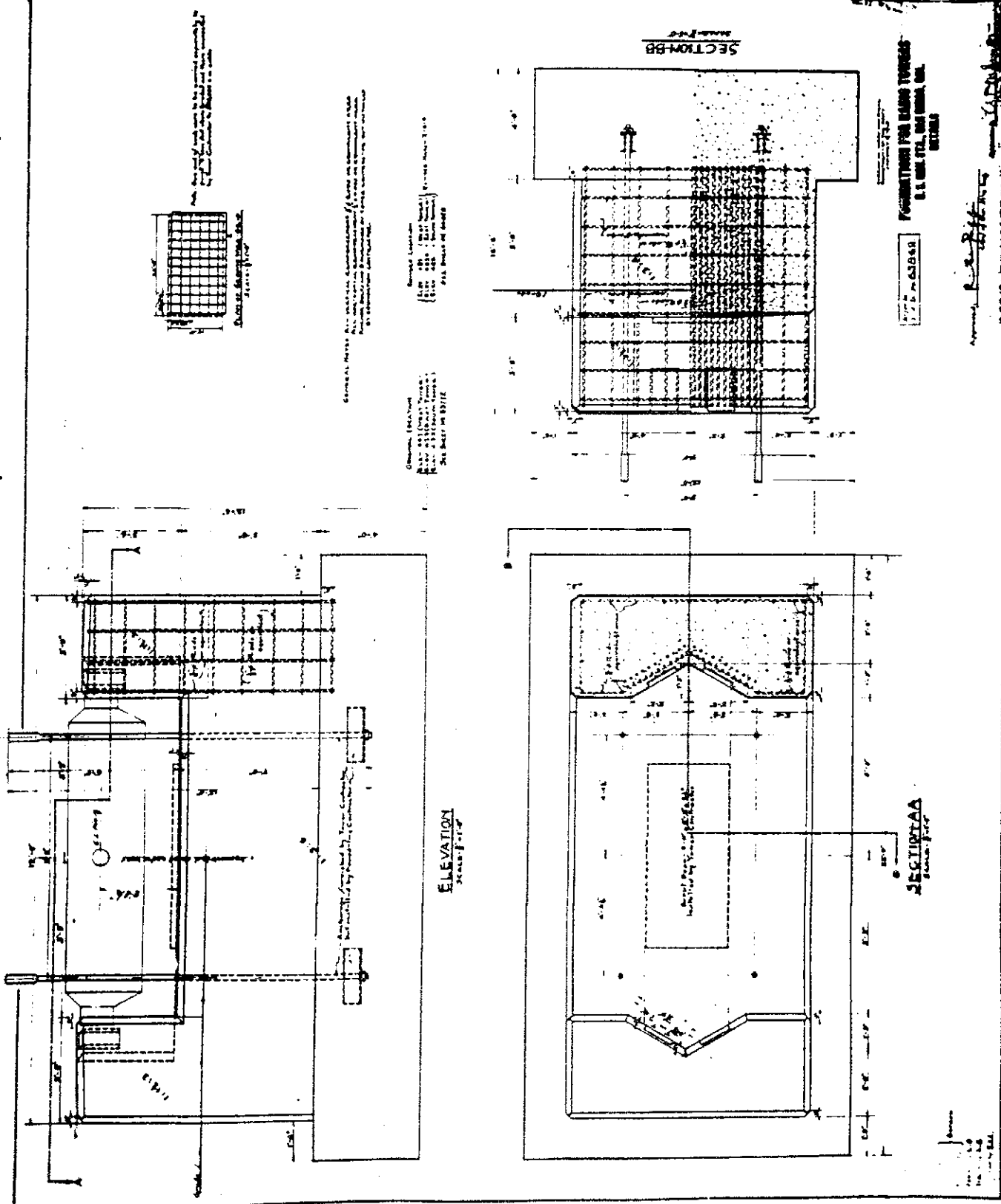
Detail of Casement Door
Scale 1/8" = 1'-0"



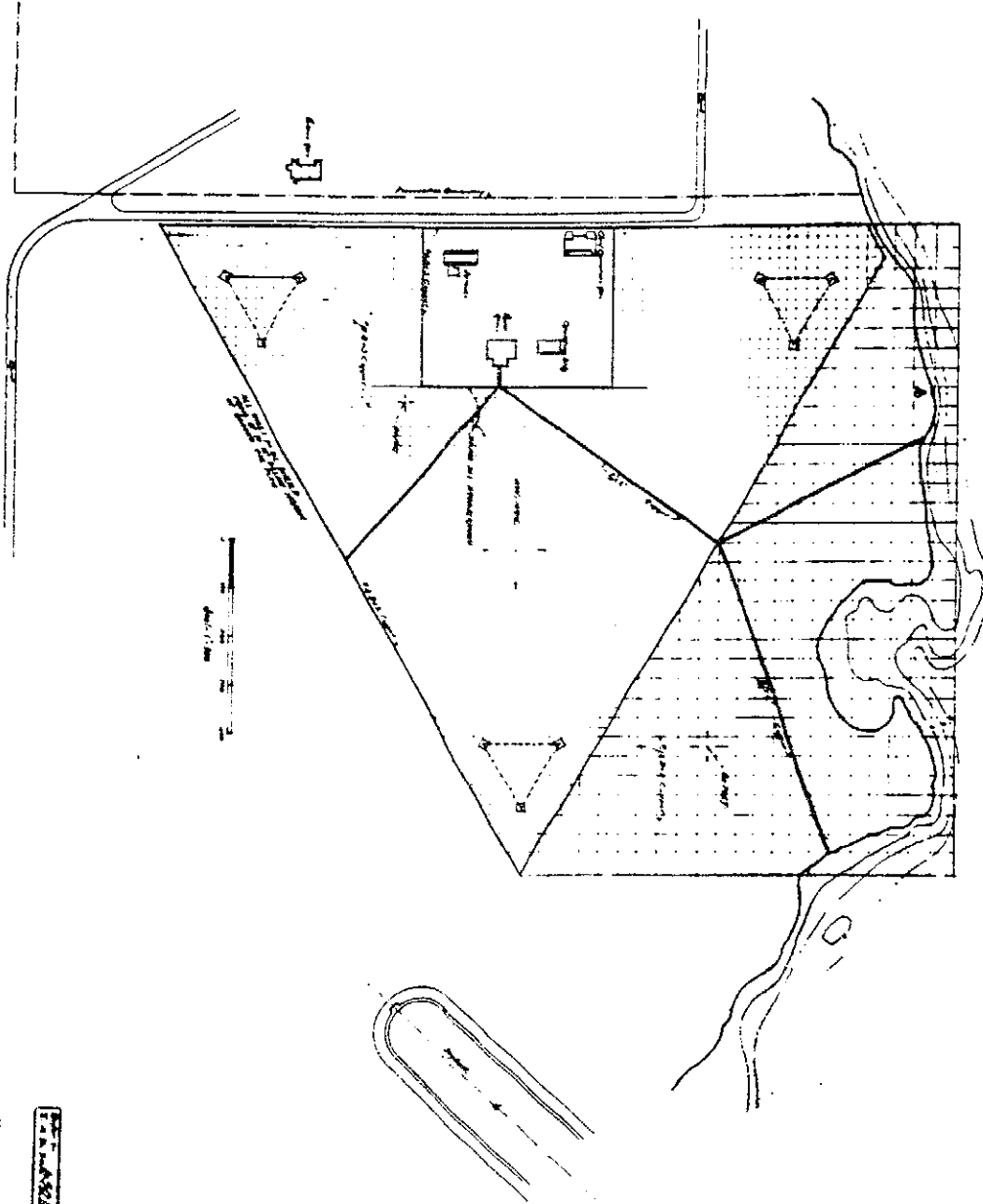
Foundation Plan
Scale 1/8" = 1'-0"

Department of the Navy, Bureau of Naval Facilities		Drawn by: J. H. Smith
U.S. NAVAL RADIO STATION SAN DIEGO		Checked by: J. H. Smith
BARRACKS BUILDING		Scale: 1/8" = 1'-0"
Floor Plans & Details		Sheet No. 71
Approved: J. H. Smith		Date: 10-10-50

1224-23-29



1224-93-18



12-1-64-3028

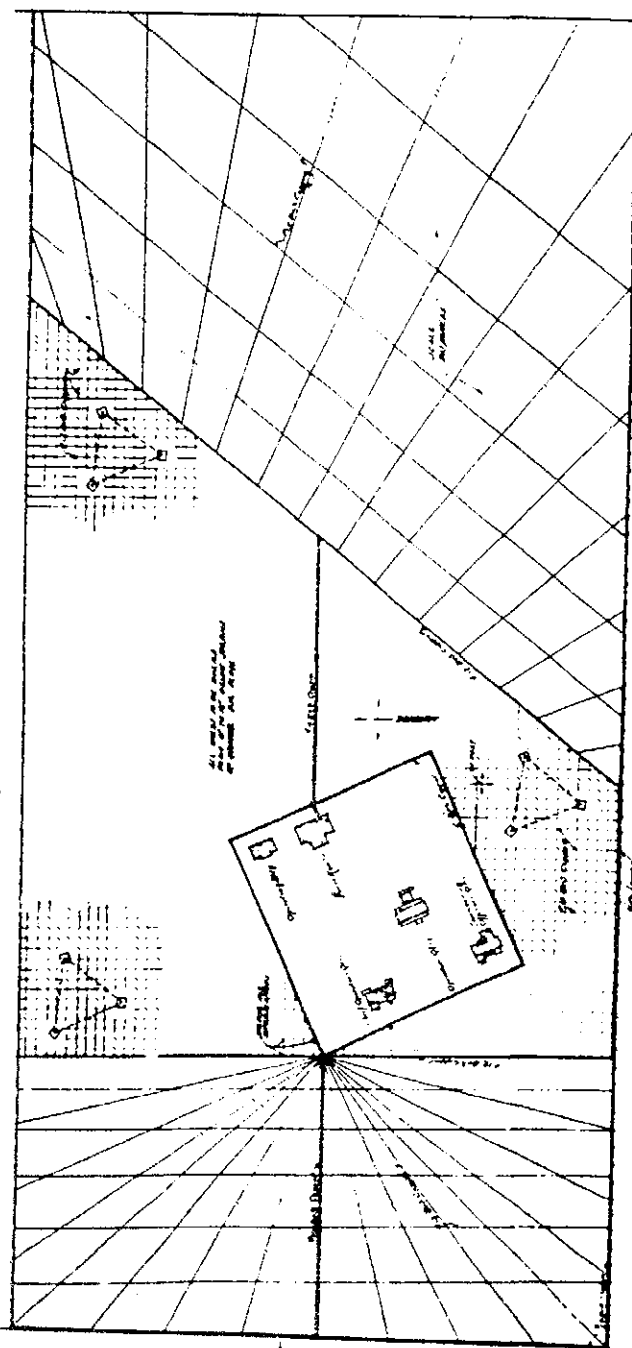
GROUND WIRING

U.S. MARINE STATIONS - SAN DIEGO CAL.
MAR. HARBOR TUG & CANNON, PI
MAR. WAREHOUSE - MAR. HARBOR, TI

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GROUND WIRING

US NAVAL STATION - SAN DIEGO, CAL.
 PEARL HARBOR 7th & CAVITE, PI
 PLAN OF WIRING - SAN DIEGO, CAL.

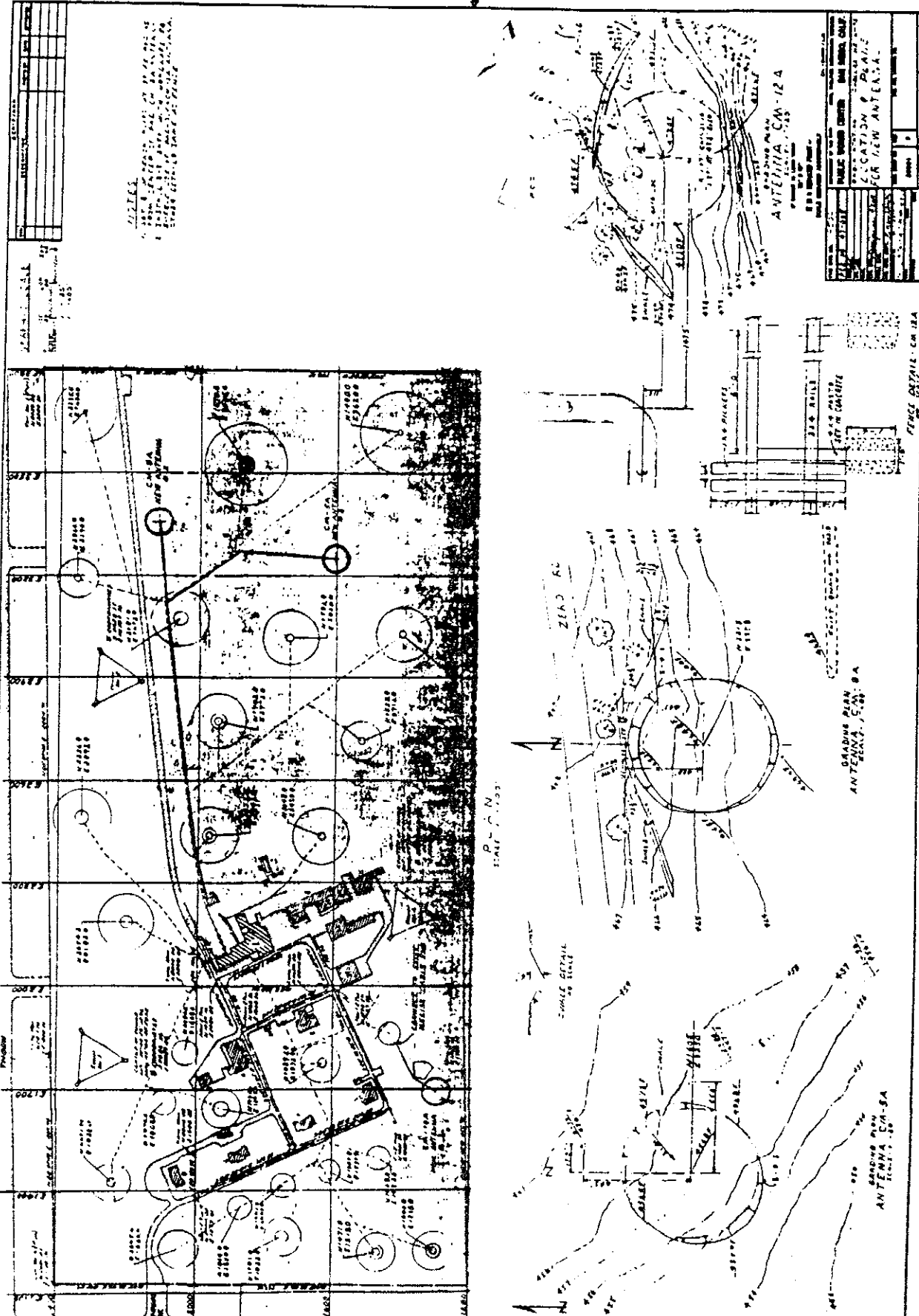
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Special Agent in Charge

Approved: [Signature]

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